



FRIDAY, JANUARY 18, 1895

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Contributions.

Railroad Signaling at Night.

CHICAGO, January 14, 1895.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have just read the letter of Mr. Lattig in your issue of Jan. 11. He presents some interesting arguments, or rather seductive fragments of arguments which would be more interesting if he brought them to a practical point. But I must confess that he leaves me without much valuable information. Why does he not tell us what he is driving at? He says "he fails to understand the logic which extols the semaphore for day service and condemns position for night service." But, as I understand the matter, Mr. Johnson and the others who are discussing a change of lights for night service stick to the single light because they feel compelled by stern necessity to do so. Every practical signalman would like to see the Koyl semaphore made perfect and adopted. If the beautiful ideals of Professor Koyl cannot be made available for practical use without too much expense, and training of inspectors, everybody would like to see the illuminated semaphore of the Union Switch & Signal Company perfected and adopted. But the plain fact is that neither of these inventions has found favor with enough railroad officers to give it a respectable standing.

Mr. Lattig's letter might be supposed to be an argument in favor of the Boston & Albany practice, where two lights placed in a horizontal line indicate danger, and two lights in a vertical line indicate go ahead. But I do not suppose that he even had that road in mind when he wrote. That system, like Koyl's, costs too much. As Mr. Lattig must know, from statements that have appeared in the *Railroad Gazette*, the expensiveness of this Boston & Albany system is one of the very things which have produced the present discussion and tend to keep it alive. The Boston & Albany system requires three lamps for each semaphore. The Old Colony people have tried this three-lamp plan sufficiently to find that it is very expensive, as compared with whatever additional value it may possess over the ordinary one-lamp signal. I believe an officer of that road, in a letter printed in your columns, said that they could save \$4,000 a year by abolishing two of the three lights. Simplicity is all-important in this matter, not only for the benefit of the men that use the signals, but also to reduce the expense, and to avoid the necessity of getting high-class mechanics for lamp tenders.

As to Dr. Jeffries, the statement quoted from his book was written several years ago, but yet there is a good deal of truth in it which is applicable to end-of-the-century times. Attempts at shape are not precisely ridiculous, but yet the difficulty of making shapes just as we want them is very great. I remember a description printed in your columns two or three years ago of a signal invented by some impractical enthusiast near Philadelphia in which a horizontal tube of small diameter was to be placed in front of each lamp so that the observer at a distance of 10 rods or 100 rods could look through the tubes and see three or more lights distinctly and not be dazzled by the blending and apparent twinkling of the lights, even when they were pretty near together; but I have not heard that this man ever got his signal into use anywhere, and it is scarcely to be apprehended that such a clumsy device would find favor with practical men.

I repeat that the great need in signaling is simplicity; that is where the semaphore excels in the day time. Why should we bother our heads with the very attractive but quite useless notion that we must have the same kind of simplicity in the night that we have in the day time? By day light an oblong board attached to a pole is the best signal. At night what can be better than a colored light? None of the objections to green for all-clear have any weight except the fear that some color-blind engineman will some day call a red light a green one. If the railroad managements of America would remove from the service all color-blind engineers and firemen I should at once

urge you, without the least hesitation, to reprint, with added force if possible, the strong arguments that you have published during the last two or three years in favor of the abolition of the white light for all clear.

We may all agree with Mr. Lattig that the perfect night signal is coming; but if it is not coming for 50 or 100 years, or until incandescent electric lights are as cheap and durable as track spikes, why should we wait for these millennial conditions? Q K.

The Nicaragua Canal Again.

School of Mines,  
ROLLA, Mo., Dec. 26, 1894

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have read Mr. Le Baron's remarkable statements in your issue of December 21 with a great deal of interest. It is truly astonishing that such a route for a trans-Isthmian canal, so much shorter and more direct than the Nicaraguan route, with no cutting that "will exceed 10 ft. above the water line," has not been made known before. Doubtless the Nicaragua Canal Company would have been content to assume some other title, and adopt this more favorable location had it known of it.

But where is this route? Why does not Mr. Le Baron make a clean breast of it? Furthermore, how does Mr. Le Baron know that it can be built for "at least \$10,000,000 less than the location now proposed?" Such definite figures imply not merely a reconnaissance, but a thoroughly elaborated survey. Mr. Le Baron could not have done this unaided, and the expenditure of capital for such a survey would of necessity have been very great. I have not heard of any survey of this kind, and yet the avenues of information from the Isthmus have been continuously open, and such an undertaking as this could not have been kept secret.

COURTENAY DE KALB, E. M.

JACKSONVILLE, FLA., Jan. 7, 1895.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In reply to Prof. De Kalb's letter of the 26th ult., in regard to mine, on a new route for an interoceanic canal, published in your paper of Dec. 21, I would say that I am not surprised at the fact that the Professor is astonished. But I repeat what I say, that such a route does exist, and I am prepared to prove it by surveys and figures, and I am fully aware of the responsibility I assume, both to the world and to my own professional reputation.

I am on good terms with the canal company, and make this statement from no feeling of hostility to them or the enterprise; on the contrary I am a true friend of the company, and I am persuaded that the fact that a new route has been discovered, vastly more practical and less expensive, and avoiding the many objectionable features of the present location, cannot fail to act as a strong argument in favor of the construction of the canal, and prove of the greatest assistance to the enterprise.

Mr. De Kalb asks, "Where is this route? Why does not Mr. Le Baron make a clean breast of it?" This I am ready and willing to do, but I would remind Mr. De Kalb of the old adage about giving advice unasked. When the proper times comes, and to those interested, I shall take pleasure in pointing out this new line, and proving all my assertions regarding it.

My object in speaking at this time is to prevent the government from committing itself to the construction of the canal on a location enormously and unnecessarily costly, dangerous and uncertain, when a route exists, which is known to me, free from all these objections. Paradoxical as it may seem to Prof. De Kalb, and perhaps to others, I have surveys and borings of this route, but it is unknown to anyone but myself as the location of a ship canal. Having been on the Isthmus for two years, and personally examined this route, I know whereof I speak.

J. FRANCIS LE BARON, C. E.

Light Railroads in England.

LONDON, Dec. 10, 1895.

TO THE EDITOR OF THE RAILROAD GAZETTE:

You will observe that the question of light railroads is just now a good deal to the front. At the bottom of this movement there are perhaps many wire pullers, men in the city who are always anxious to float companies and who look on the light railway as a means of conveying money to their own pockets from those of the public. There are others who pin their faith to electricity and who look upon the light railway as a means to the application of electric traction. They are apt to consider that an electric line must necessarily be a high speed line, in which they are totally wrong. To my mind this whole question of heavy railway charges in England may be summed up in the word "speed." Everyone has got in the habit of prompt delivery of his goods, and so on crowded rails short trains are run at 40 miles an hour, and even higher, to clear the line, and the Board of Trade regulations demand the fullest protection and safeguards on every inch of line, no matter if it be a mere mineral siding, just as upon an express main line.

It is very commonly assumed that to have a light railway we must have a narrow gauge, which at once introduces the question of handling. The teaching of the United States has been that a railroad to use ordinary stock can be built for a very small sum per mile, and it is upon such poorly built lines that American lines have, as a rule, started out; but they started with speeds commensurate with the poverty of construction, and I venture to say that well built or poorly built there can be no safety except at speeds proportionate to the quality of construction.

There are, it is true, openings for more railroads which should be able to carry produce cheaper than horse power can do it, and yet farmers often find it cheaper now to employ horses to work the common roads than to pay railroad charges. The English roads are uniformly good. They are wide, well drained and generally of easy gradient and the traction engine is very largely employed. These are to be seen all over the country, drawing trains of two or three large and long wagons laden with produce, road material, timber, etc. They surmount the grades easily, do not damage the good roads, but find the soft places, which are at once repaired. It appears, therefore, that the light railways would have to face the competition of these traction engines which are not tied in any way as to where they are allowed to go so long as the bridges are sufficient. There are said to be several thousand of these at work in England.

Now, is it likely, except in a few special districts, that light railways can be built to do much good? If of narrow gauge they will require the trans-shipment of freight. If of wide gauge they will cost more than many of their advocates seem to think. To be a success they must, as a rule, follow the example of pioneer American roads and confine themselves to very moderate speeds. They will be merely tramways laid alongside the road, here and there cutting off a corner; but they must not be laid in the roadway, with all the accompanying expense of granite or wood paving over the whole space occupied as far as 18 inches outside each.

As to electric traction, this can alone be commercially profitable for such roads if there be current available from some electric lighting plant which can afford to sell power cheaply for the sake of securing a day load over which to spread some portion of the charges of the plant.

But the fact must always remain that the farmer must keep horses, and even if horse traction be expensive it may still be cheaper to set them hauling produce to the railway several miles distant during times when they would be idle than to allow them to stand eating their heads off in the stable and pay half rates to a light railway. So many factors enter into the question that mere pedantic argument based on a fancy for a light line cannot be allowed to settle the question.

M. AM. SOC. C. E.

New Railroad Projects in England.

Year by year it becomes increasingly evident that, so far at least as the construction of main line railways is concerned, we in England have reached a practically stationary condition. The causes of this state of affairs are of course complex. A principal cause, and one applying all over the country, is no doubt the depression of trade and the want of confidence induced by the succession of disappointments and losses which English investors have experienced in the last few years. In and around London the main cause is more probably to be found in the action, and still more in the language of our new and very loud-voiced, even if not very influential, school of municipal socialists, whose most important representatives are the members of the London County Council.

Two or three years back there was a whole group of acts passed for new and much needed underground railways in London. Only one of all of these undertakings—and this practically an exception, proving the rule, for it is really little more than an extension of an existing great railway company, the London & South Western—has so far been able to raise its capital and commence its works. Last year a single new metropolitan company, the London, Walthamstow & Epping Forest Railway, obtained its act after a protracted battle with the London County Council as to whether it should be compelled as a condition of existence to carry the bulk of its passengers at fares which could hardly pay mere working expenses. This year this company promotes two new bills.

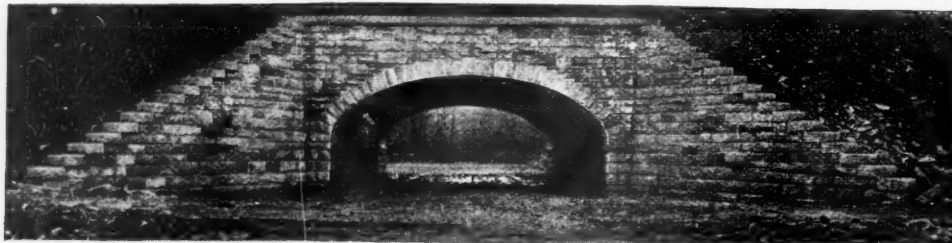
By one of them it seeks to obtain a guarantee of dividend from London local taxation. By the other and alternative bill it proposes to abandon its undertaking entirely. In other words, the provision of railway accommodation, for the local traffic of London, a city twice as big as the next largest in the world, where, moreover, the need for new facilities for passenger movements is becoming every day more crying, has ceased to be possible as a commercial undertaking.

Elsewhere it is the ever closer understanding between the great existing companies which renders it more and more difficult to construct a new line with any reasonable hopes of success. In the south and southwest of England, for example, a couple of months back no less than three important schemes were being actively pressed forward. One of them would have given the Great Western a new and independent access to Portsmouth, whose great naval station requires enormous quantities of steam coal from the Great Western fields in South Wales. A second would have given to Bristol, a town of 300,000 people, at present solely dependent on the Great Western for access to London, an alternative line of communication via the South Western. A third scheme would have connected this latter company with the furthest corner of Cornwall, which also is at present a Great Western preserve. Every one of these schemes has now been abandoned, at any rate for the present session; and without attempting to pry into secret history, it may safely be said the reason has been in each instance the same, the refusal, namely, of the South Western or Great Western, as the case may be, to have any share in the invasion of rival territory with the certainty of provoking reprisals later on.

Not but what there are scattered here and there over the face of England local attempts at new railways which



may prove hereafter to be of serious importance. For one thing, there is a new line across Kent, from Maidstone to Dungeness, near Hastings—a point possessing great geographical advantages and also, according to the engineers, great natural facilities for the construction of a harbor to trade with the French ports of Treport and Boulogne. Then again an attempt is to be made for the twentieth time to invade the northeastern district of England, at present monopolized by the company of that name, by means of a new railway from Hellifield and Skipton to the historic town of Darlington. Another



Pelhamville Bridge, New York, New Haven & Hartford Railroad.

"hardy annual" is a bill for an independent line to Milford Haven, a harbor which hitherto has certainly been a stepchild in the Great Western family. A single one of our great English companies (I mean the Manchester, Sheffield and Lincolnshire) still adheres to the traditions of an earlier epoch, and pushes forward merrily in a career of extension and competition. Its new line from Nottingham to London is already under construction. This session important proposals will be brought forward tending to the consolidation of the small companies, and the physical improvement of the existing lines which are to afford it in the immediate future access to Birmingham, and before long, doubtless, also to Wales, if not to Ireland as well.

There is another proposal to be submitted to Parliament, which deserves notice, not for its intrinsic importance, but as another instance of survival. A new barge canal is to be dug at Oldham, the great cotton spinning center, a few miles east of Manchester, presumably in the hope of attracting thereby on to the Manchester ship canal some of that ocean traffic in bale cotton which it so sorely needs.

Signs, however, are after all not wanting that our English railways have a future as well as a past. As most American readers probably know, hitherto we have had in this country but one standard of railway construction. Viaducts and bridges, permanent way and station buildings, signaling and interlocking, all were required to be as elaborate and as perfect on the pettiest local branch with four trains a day as on the main highways of the express traffic of the country. The consequence was that as has recently been confessed by the President of the Board of Trade himself, speaking in his official capacity, the most unimportant line passing through the easiest country could not be built for less than \$50,000 a mile. One or two half-hearted attempts have, it is true, been made to put an end to this preposterous state of affairs. As long ago as 1868 an act was passed authorizing the construction of any railways which should be sanctioned hereafter as light railways according to such modified requirements as the Board of Trade might from time to time lay down. But with the true official stolidity the Board of Trade "lay low and ain't sed nuthin," and from that day to this the act has been a dead letter. At last, however, it would seem as though the English public were slowly waking up to the absurdity of the present situation. The *Railroad Gazette* has already chronicled the meeting of a representative light railway conference at the Board of Trade last month. In the coming session of Parliament proposals for new light railways to be constructed and worked in a single and inexpensive manner will be put forward from various parts of the country: from Gloucestershire, from Wiltshire, from Cambridgeshire and from Kent, partly by existing railway companies and partly by new and independent promoters. What fate these proposals will meet with yet remains to be seen.

One thing is perfectly certain, that a small company with a total capital of, say, \$200,000, cannot possibly afford the expense of an exhaustive inquiry, with its "agent, counsel and witnesses," into the principles which should guide Parliament and the Board of Trade in reference to secondary railways. There is talk, therefore, of referring the whole subject, as an abstract question, and apart from the details of any individual case, to a joint committee of both Houses. But the shadows of an imminently impending dissolution overhang all Parliamentary business, and there is not much hope that any serious attention will be given to a subject out of which even the most ingenious of politicians would find it difficult to extract a fraction of party capital.

So much for England. A word in conclusion about Scotland and Ireland. A month ago all the signs pointed to a battle royal in the Highlands of Scotland. Three out of the five great Scotch companies were apparently prepared to fight to the death for the traffic of a district which all had agreed in regarding for half a century as too unimportant to require any railway communication at all; while a fourth company stood on one side with a modest claim for running powers—in America I believe you call them "trackage rights"—over the line in question along the Caledonian Canal, from Inverness to Fort

William, to whichever of the three combatants Parliament might give authority for its construction. But here, too, it appears that more pacific counsels have prevailed, and the fight is likely, if not to be averted entirely at least to be reduced to a simple duel between the two hereditary rivals, the Caledonian and the North British.

In Ireland there is just one scheme which may interest American readers. The railway is to be taken down to the water's edge at Magilligan Point, on the east shore of Lough Foyle, by the Belfast and Northern Counties, the

keystone was set, the work was found to be so accurately done as to require no additional cutting.

The excavation for foundation showed blue mud for several feet below the surface, but under this a hard sand was reached and upon this the masonry was built. A course of about three feet of rubble concrete was first laid, composed of concrete of the usual proportions laid to a depth of about 6 inches; then large stones were placed not less than one foot apart and the concrete thoroughly rammed between them until the required height was reached. The masonry abutments were then built as usual.

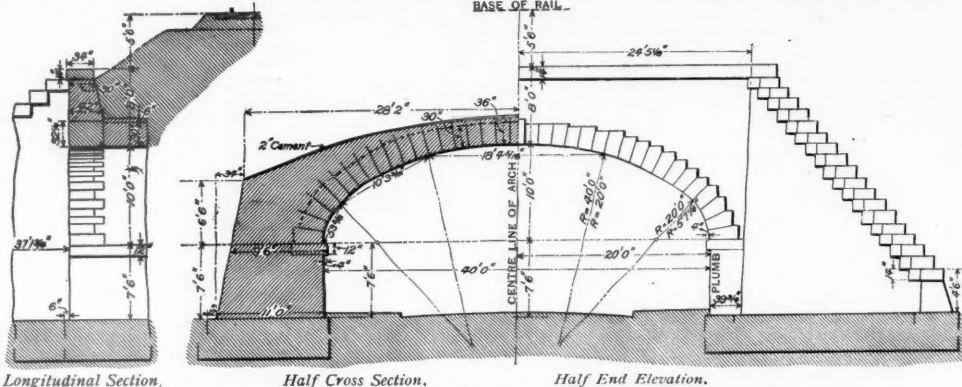
The timber centers were constructed with supporting struts centering to two points for purposes of wedging. Auxiliary wedges were also placed at each abutment. The center frames were spaced three feet apart and lagging was laid under the middle of each ring stone leaving the joints exposed to view during construction to permit accurate setting. The position and direction of each radial joint was then marked upon the centers with the result as has already been mentioned that when the arch was completed and the keystone set it was found to fit accurately in place without extra cutting. The wedges were then slightly loosened to insure solid bearing throughout. The arch was finished with a coat of 2 inches of cement mortar, but it has not proved entirely water tight.

This is only one of very many handsome and durable structures on which Chief Engineer F. S. Curtis is to be congratulated. The engineer in charge was Mr. Henry B. Seaman, and his assistant Mr. F. M. Smith. Mr. John B. Westbrook was the contractor, and Mr. Charles Sillery sub-contractor.

W. M. ACWORTH.

#### Pelhamville Stone Arch Bridge.

The stone arch shown in the accompanying cuts, was recently completed at Pelhamville, N. Y., in the general improvements of the New York, New Haven & Hartford in four tracking and the elimination of grade crossings.



Pelhamville Bridge, New York, New Haven & Hartford Railroad.

A crossing for a street was required in this vicinity and in order to avoid the railroad grade, it was deemed advisable to construct an under-crossing through the old embankment. The embankment, at the time, being wide enough for only two tracks, any crossing through it must be low enough to permit the foundations to go down below original surface where the fill was to be widened for these two additional tracks. This suggested a stone arch, with a roadway near the original surface, as the most economical and permanent construction.

The structure is a 40-foot span, five-center arch, with a rise of 10 feet; length of barrel, 76 feet; height of springing line above roadway, 7 feet, and wings extending at 45° to the face of the arch. The stone is a gneiss found in the vicinity of Yonkers, N. Y., with the exception of the keystone and coping, which are of Connecticut granite and Palatine Bridge (N. Y.) blue stone, respectively.

The lines of the intrados correspond to those of a theoretical ellipse of the same span and rise, the greatest variation from the theoretical line being about one inch. The theoretical line of pressure, under dead load and partial live load, lies within the inner third of the arch sheeting until the short radius arc is reached; here it passes to the outer edge of the ring stones, and thence down through the abutments, remaining within the inner third of the masonry until the foundation is reached.

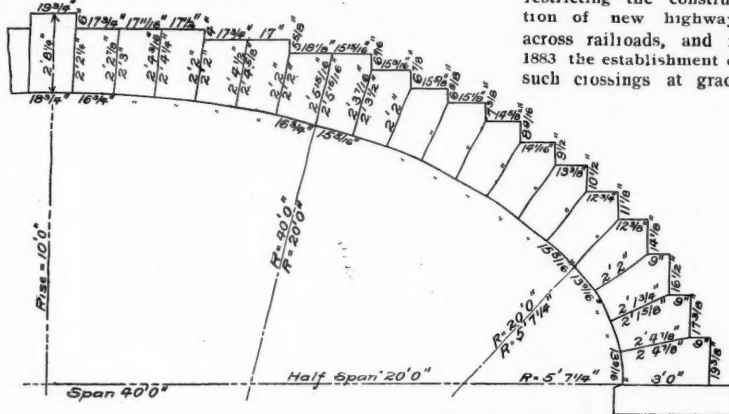
In designing the arch, a joint was placed at each change of curvature, to simplify construction and erection, thus avoiding the use of the extra templates. As will also be noticed the top joints of the three ring stones on either side of the keystone are brought to a level bed as are also those of the next adjacent stones. The radial joints were so extended as to make the step not less than 4 inches and increasing as the springing line was approached.

The sheeting and ring stones were all accurately cut in the quarry, allowing for 1/4 inch joints, and when the

#### Connecticut Railroad Commissioners' Report.

The Railroad Commissioners of Connecticut, George M. Woodruff, William O. Seymour and A. C. Robertson, have issued the forty-second annual report of the Board. The

statistics are for the year ending June 30, 1894. The opening chapter deals with highway grade crossings, with special reference to the applications for approval of the crossing of steam railroads at grade by electric roads. Connecticut passed a law forbidding the construction of new railroads across highways at grade as early as 1849, but this was in advance of public sentiment and the law became a dead letter. In 1883 the power of the Commissioners, theretofore considerable, was restricted, and they were permitted to authorize such a crossing only "for special reasons," and since then practically no such crossings have been allowed. In 1870 a law was passed restricting the construction of new highways across railroads, and in 1883 the establishment of such crossings at grade



Dimensions of Ringstones, Pelhamville Bridge.

was absolutely prohibited. In 1889 the construction of street tracks across railroads was prohibited, but in 1893, by the influence of the electric companies, this was modified so that the Commissioners might approve such a crossing; but in the only two applications made, the Commissioners have refused approval until additional safe guards should be provided, and so it is expected that the electric companies will try this winter to get a less stringent law. Considerable attention is given in the report to the question of freight transportation on street-railroads. Massachusetts, Rhode Island and Pennsylvania forbid street lines to carry express or freight. Courts and other authorities have endeavored to make a distinction by calling the usual standard railroad a "rail-



road" and a street line a "railway." It is pointed out that we are likely to find it increasingly difficult to maintain this distinction, and reference is made to a decision of the Supreme Court of California, Dec. 13 last, declaring that there is no good reason for the distinction.

The taxes paid to the State of Connecticut by the railroads during the year amounted to \$733,447, and the taxes paid by these railroads in all States amounted to 19 per cent. of their net income. The length of railroad in the State is 1,013 miles, the same as the year before. The casualties to persons are summarized as follows:

	1894.		1893.	
	Killed.	Injured.	Killed.	Injured.
Employees . . . . .	23	171	64	445
Passengers . . . . .	2	10	7	12
Trespassers . . . . .	74	101	85	78
Others, not trespassers . . . . .	14	8	18	15
At highway crossings . . . . .	10	12	16	15
	123	302	190	565

No passenger was killed in a train accident. While the number of injuries, both fatal and non-fatal, was very much less in most of the classes than it was in 1893, it is to be observed that the number of tramps injured, fatally and otherwise, increased. Of the sixty trainmen

injured in coupling accidents only one was killed, while of the thirty-one who fell from trains ten were killed.

injured in coupling accidents only one was killed, while of the thirty-one who fell from trains ten were killed.

Ten pages are given in the report to notes on the physical condition of the several roads. On the New York, New Haven & Hartford many important improvements are noted on the minor lines as well as on the New York and New London Divisions, where millions of dollars have been spent in straightening the line and laying additional tracks. On the Naugatuck Division, which is quite crooked, the trees and bushes on the inside of curves have been trimmed so as to give a better view to the engineers. The New York & New England has done more work in the maintenance department than for several years. Eighty-seven miles of line have been re-ballasted, fourteen sidings to factories have been put in, and large amounts of new rails and sleepers laid.

An English Ten-Wheeler.

In *The Engineer*, December 14, 1894, will be found beautiful illustrations of a ten-wheel locomotive built by Sharp, Stewart & Company, of Glasgow, from the designs of Mr. D. Jones, Inverness. Accompanying the illustrations and description of the locomotive there is a description, with cuts, of Sharp, Stewart & Company's shops. Outside of the interest which railroad men will have in the description of the shops, and the illustrations, there are some features in the locomotive itself that are worth notice.

In the first place it is a ten-wheeler, with outside cylinders, and corresponds closely with American practice, except in the dimensions of the reciprocating parts, which are lighter, and in the location of the steam chests in the cylinder-saddle inside the frames, which apparently requires the use of long steam ports giving a high percentage of clearance. This locomotive has a balanced poppet throttle valve in the dome and the back drivers are equalized; and in other respects we notice the tendency towards American designs of details. The piston has a single plate and the crosshead is very light and of rather novel design. The piston rod at the crosshead end, has a large eye, through which the wrist pin passes. The front end of the main rod is made forked. In this way there is a direct connection between the piston rod and the main rod. The crosshead is formed of two slippers, one above and one below. If this design works well in service it certainly is an improvement over the clumsy crossheads commonly used. It would appear from the study of this design that there are no concentrated bending strains on the piston rod, and this may reduce breakages. The connection of the piston rod with the piston is not so satisfactory, for as near as can be learned from the drawing it requires a split stuffing box to permit the large collar, which is on the piston end of the piston rod. We have reproduced the exterior view of the locomotive and give the following general dimensions:

Length of grate 7 ft. Width of grate 3 ft. 2½ in. Length of tubes 14 ft. 5 in.; 2 in. in diameter. Cylinders, 24 in. diameter, 26 in. stroke. Driving wheels of cast steel, 63½ in. over tires. Frames of mild steel plate with crucible cast steel driving box

The Shamokin Explosion.

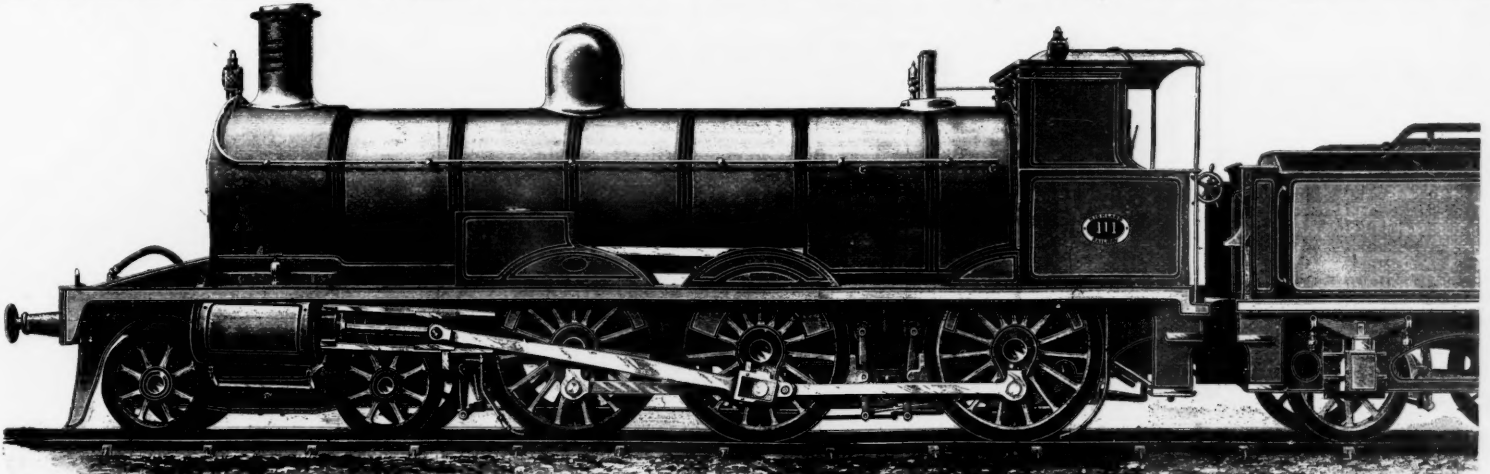
Our readers are doubtless familiar with the general facts of the tremendous boiler explosion that took place in the outskirts of the town of Shamokin, Pa., on October 11th. No explosion approaching this one in magnitude has occurred in this country, and it was described rather fully (though somewhat inaccurately) in the daily papers. The loss of life at Shamokin was comparatively small. Many a less notable explosion has had a larger death list, but so far as the number of boilers involved is concerned, the present disaster is without a parallel. The great boiler explosion at Friedenshutte, in Upper Silesia, on July 25, 1887, approaches it more nearly than any other, in this respect. In the Friedenshutte explosion twenty-two boilers (four of which were empty) burst simultaneously. Three firemen were killed instantly, and nine other men were injured so badly that they died three days later. In addition to these, thirty men and women were more or less severely injured.

In the explosion at Shamokin the destruction was so

I saw there, I noticed that most of them broke through the line of rivet holes of the small courses in front of the steam outlets, nearly in two halves. Others broke on the small courses back of the front hangers. I saw one piece with the front course and front head, and another with five courses and a front head. I also noticed a part of two courses torn in shreds and badly battered up, but I am not sure whether this was a piece of a boiler or of one of the iron stacks, as it was covered with mud and blackened with coal dust.

"In the course of a talk I had with one of the firemen, he informed me that he had been on the night shift, that he had been home only a short time when he heard the noise, and that it seemed to him 'like a pack of fire-crackers going off, only not so loud, more like squibs.' He said eighteen boilers on the right and nine on the extreme left, had blown up, leaving intact a battery of six, which were on the left-hand side of the center, while three other boilers adjoining this battery were thrown down out of their beds. I am not sure that this was correct, as others told me that all nine were thrown down and scattered about, except that three of them fell together. It is possible that the latter version is the correct one, as the photograph that was taken on the day after the explosion shows three boilers lying together, side by side. The sections that were thrown backward landed on the hill in the rear of the original position of the boilers, and did no further damage. One piece was carried over a culm bank fully 100 feet high and in its passage

Six-Coupled Bogie Goods Engine, Highland Railway.



general and so complete that it is difficult to find a satisfactory explanation of it. One of our most experienced men visited the scene of the explosion shortly after it occurred, and we present the following extracts from his report:

"When I reached the site of the Henry Clay colliery the ground was pretty well cleared up, but I managed to see a good many broken sections of the boilers, most of them partly buried in the culm banks with the fractured ends projecting upwards, and also many broken steam and water pipes, steam and water valves, fire fronts, and beams for supporting the boilers. I also made numerous inquiries from employees who were present both before and after the accident; but their statements were so conflicting that I am in doubt as to the correctness of any of them.

"There were thirty-six plain cylindrical boilers, each 34 inches in diameter and about 44 feet long outside of the heads, the heads themselves being of cast-iron, flat or nearly so, and about two inches thick. The sheets were single riveted, and varied in thickness from .26 inches to 5-16 inch. I was informed that there were six batteries, with six boilers in each. The individual batteries were further separated by longitudinal division walls whose thickness I could not ascertain, into groups of three boilers each, in such a manner that in every case three boilers were set over one fire, and connected at the front and rear and top and bottom of the heads by cast-iron water and steam pipes 3 inches in diameter. Each sub-battery of three was also provided with a cast steam pipe, 12 inches in diameter and about 8 feet long, with 3½ inches flanged outlets that connected with 6 inch cast-iron nozzles riveted to the center sheets of the respective boilers, and also with two 4 inches flanged outlets, on top, for safety-valves. There were two 3½ in. safety valves to each sub-battery or four such valves to each battery of six boilers. In addition to these openings in the steam pipes, there was, in each one, a 4-inch outlet on the front side, and to this was connected a 4-inch pipe about 5 feet long, at the end of which was a 4-inch tee-shaped stop-valve. The stop-valves were connected to a 12-inch cast-iron pipe, built up of eight-foot lengths, and extending across the entire battery of 36 boilers. At the center of this main pipe there was a 12-inch cast-iron tee, to which was connected a 10-inch wrought-iron pipe, which led down to the breaker, and from which the pumps were also supplied.

"On the top of each boiler were riveted cast-iron flanged hangers with cored openings for hanger bolts and cotters; and two heavy cast-iron beams with cored bolt holes extended across each nest of three boilers, some 10½ or 11 feet from either end, the boilers being suspended from them by hangers. The feed and blow connections were attached, in every case, to the bottom of the shell, at the rear end. I saw some feed-valves, but no checks; and I am not sure that there were any checks. Pumps were used to supply the boilers, and there were also heaters, though I did not find out what kind of heaters they had. Ninety to ninety-five pounds of steam were usually carried, and sometimes the pressure was up to 120 pounds." [Assuming the iron plates of the shell to have a strength of 50,000 pounds per square inch, and taking the efficiency of the longitudinal, single-riveted joints at 50 per cent., which is probably about the right figure, it is easily seen that at 120 pounds pressure the factor of safety of the shell was only about three.—Ed.]

"The explosion occurred about 7.30 a. m. on the morning of October 11th, shortly after the day shift of firemen came on. In this shift there were four men in addition to the water tender. All five were killed instantly, and another person—a boy who was at work near the culm tipple in front of the right-hand boiler—was badly scalded and injured about the hips, so that he died a day or two afterwards. Several others were injured, two of them rather seriously; they are now in the hospital, and are expected to recover.

"In looking over the remaining parts of the boilers

over the top of the bank it scooped out the culm to a depth of about one-third of its own diameter, landing in a valley on the other side. Another piece containing five courses was thrown across the valley to the northwest, and landed on the slush bank west of the breaker after a flight of about 500 yards. Another piece went through the upper corner of the breaker, about 500 feet away, slightly injuring a boy who was working there. Still another fragment went through a hoisting-engine house about 300 feet distant, cutting the cable and carrying out the side of a small house fifty feet below. I saw another piece about thirty feet long, with one head still in it, entirely buried under an ash bank except for about two feet of its length that was still uncovered. I was informed that this was a part of one of the exploded boilers, but I doubt it on account of its position, although the condition of the broken end is very similar to that of a number of other pieces.

"I have made some inquiries regarding the cause of this explosion, but thus far I have been unable to find any one who is willing to express an opinion. It seems to me, however, that the iron in these boilers may have been greatly weakened by the vibrations and strains due to repeated expansion and contraction; for most of the breaks seem to have occurred at points most likely to be affected by such a cause. The iron in all these boilers is of very poor quality, but it is of about the same grade as is used in very many other boilers in the coal regions."—*The Locomotive*.

Vermont Railroad Commissioners' Report.

The Railroad Commissioners of Vermont, Samuel E. Pingree, Amory Davison and Leon G. Bagley, have issued their fourth biennial report which is for the two years ending June 30, 1894. The opening chapter gives a brief historical sketch and discusses the present business situation. The casualties to persons are shown in the following table:

	Two years ending June 30, 1894.		Two years ending June 30, 1892.	
	Killed.	Injured.	Killed.	Injured.
Employees . . . . .	35	50	29	53
Passengers . . . . .	8	33	0	42
Others . . . . .	18	22	33	17
	61	105	62	112

Four passengers were killed in train accidents.

The length of railroad in the State is 982 miles. The notes of the physical condition of the several roads show that the Central Vermont has built ten new iron bridges on its main line and nineteen on the Rutland Division. No accident has occurred in Vermont during the past two years by reason of the imperfect or inadequate quality of a railroad bridge superstructure. The railroad companies have generally complied with the law requiring frogs and switches to be blocked to prevent men catching their feet in them, though the law is defective in not providing a penalty for disobedience. The chapter devoted to investigations of accidents gives the particulars of the wreck of a bridge at Wallingford on Sept. 6, 1893, when a train wrecker took the trouble to go to the top of a Howe truss and remove the nuts from the vertical tension rods. No clue to the perpetrator has ever been found.

Although Vermont is one of the smallest States the report is one of the largest, weighing four pounds. It contains the reports of the companies in full and the railroad laws of the State.

## Recent Small Bridges on the Baltimore &amp; Ohio.

An important part of the improvements being made by the Baltimore & Ohio is in the new bridges being built under the direction of Mr. J. E. Greiner, Engineer of Bridges, assistant to Mr. W. T. Manning, Chief Engineer. We illustrate details of one span of Bridge No. 14, a three-span bridge on the Midland Division in Ohio. This bridge, in common with other recent work, is designed for two 125-ton engines followed by 4,000 pounds per lineal foot, under the Baltimore & Ohio specifications for 1894. It has one span, 100-feet c. to c.; end-piers, five panels, each 20 feet; depth, 25 feet; width, 16 feet. We show also a girder (elevation plan and sections) of a plate girder bridge at Bessemer, Pa. This is a two-span, four-track, skew bridge. It carries the railroad over Turtle Creek, and also over the Union Railroad.

The specifications are new, have some novel features, and some extracts from them will form the best description of the bridges that we could give.

(8) The material in superstructure shall be as noted below, unless otherwise stated on approved stress sheets, or in letter of invitation:

- Medium steel—Eye-bars, pins, rollers and shafting.
- Soft steel—Plates, shapes and rivets.
- Cast steel—Machinery for draw-bridges.
- Wrought iron—Fillers, bolts and unimportant details.
- Cast iron—Washers and filling rings only.

Stiffeners shall be in pairs, and spaced so that their distance center to center will not exceed the depth of girders, and have a maximum limit of five feet. They shall be placed at all points where loads are concentrated.

(28) There shall be two pairs of stiffeners over the end bearings of stringers or girders, the projecting legs of which shall be as wide as flange angles will permit. These four stiffeners including their fillers, shall be proportioned as a column to take up the maximum end shear.

(29) Intermediate stiffeners shall be not less than given below. Intermediate fillers to be used at option of contractors.

For webs 4 ft. and under . . . . . 3x3x5-16 angles.  
For webs between 4 ft. and 7 ft. . . . . 3½x3½x½ angles.  
For webs over 7 ft. . . . . 4x3½x½ angles.

(34) Lateral bracing shall be proportioned for a uniformly distributed moving wind force of 300 pounds per lineal foot, acting on the bracing between loaded chords. Also a stationary force of 150 pounds per lineal foot for all truss bridges under 200 ft. in length, and for spans over 200 ft., use the formula:

$$W = 150 + \frac{4}{10} (\text{Span} - 200) = \text{Force per lineal foot.}$$

Plate girder bridges, in addition to the moving load, will have bracing proportioned for a stationary force of 30 pounds per square foot of exposed surface of one girder and floor.

(39) The net section of any tension member or flange shall be determined by a plane, cutting the member square across at any point. The greatest number of rivet holes which can be cut by the plane, or come within an inch of the plane, are to be deducted from the gross section.

nate with those in flanges, except when cover plates are over 14 in. in width, in which case they may be opposite.

(72) Six inch legs will, in all cases, be connected to web plates by two rows of staggered rivets.

(91) All steel shall be uniform in quality, and made by the open hearth process. The phosphorous shall not exceed .08 per cent, for acid, and .05 per cent, for basic metal, and certified analysis of each melt shall be furnished by contractor free of cost.

(98) Standard test specimens of soft steel shall show an ultimate strength of 56,000 pounds per square inch, with a variation not exceeding 4,000 pounds; an elastic limit of not less than ½ the ultimate strength, and an elongation taken in 8 in. of not less than 25 per cent.

(99) Standard test specimens of medium steel shall show an ultimate strength of 64,000 pounds per square inch, with a variation not exceeding 4,000 pounds; an elastic limit of not less than ½ the ultimate strength, and an elongation taken in 8 in. of not less than 20 per cent. Specimens cut from pins, however, may have an elongation of not less than 16 per cent.

(100) Full size tests of finished bars shall show an ultimate strength of not less than 58,000 pounds per square inch, an elastic limit of not less than ½ the ultimate strength, and an elongation taken between the necks of the bars of not less than 13 per cent, for bars 20 ft. and under between necks. For each additional foot over this length, a reduction of .1 per cent, will be allowed.

(101) The test bar of cast steel shall show an ultimate strength of 70,000 pounds per square inch, an elastic limit of 40,000 pounds per square inch, and an elongation taken in 8 in. of 15 per cent.

(104) In punching rivet holes in iron and soft steel, the

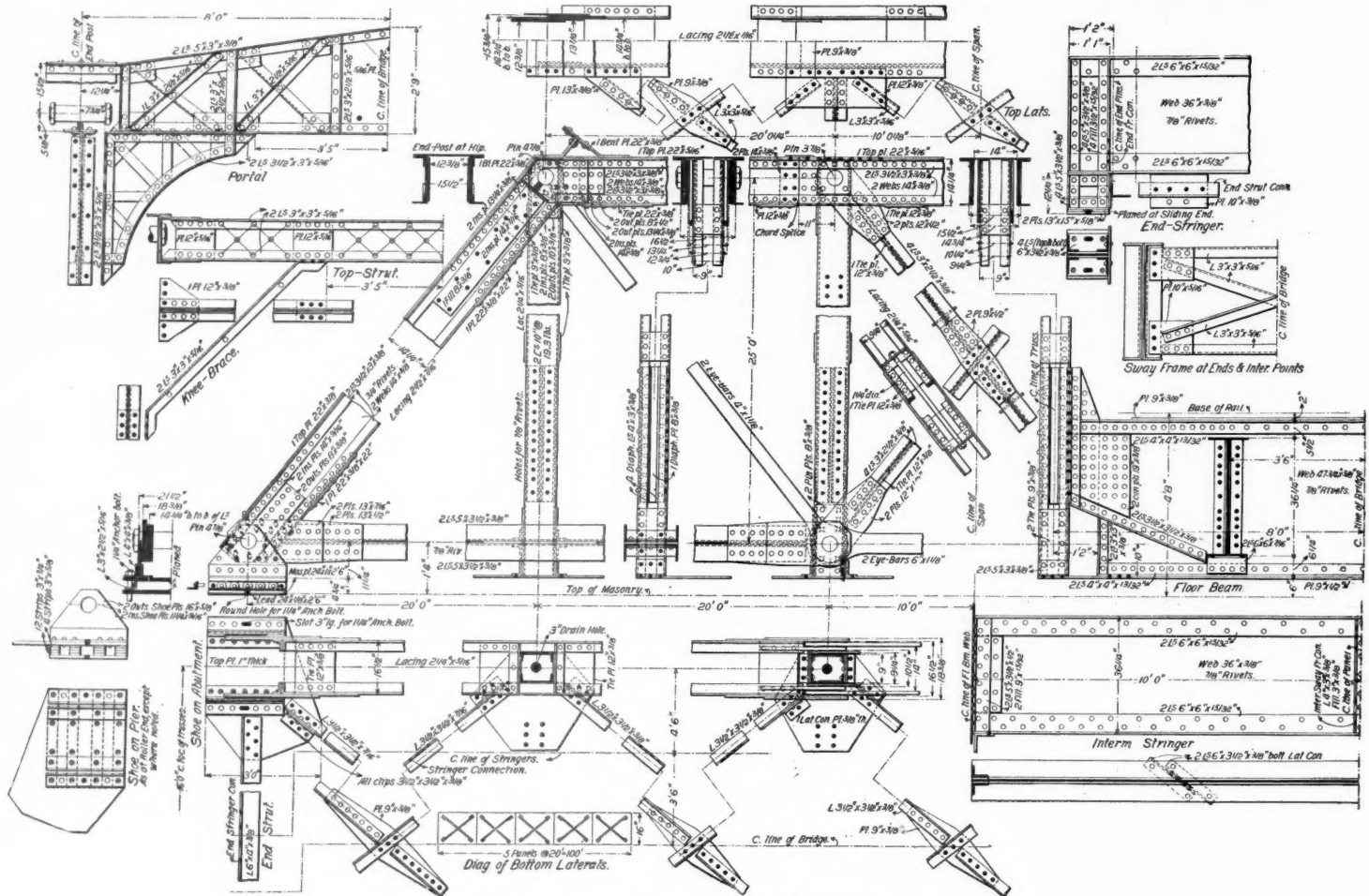


Fig. 1.—Details of Bridge No. 14, Midland Division, Baltimore & Ohio Railroad.

Mr. W. T. MANNING, Chief Engineer; Mr. J. E. GREINER, Engineer of Bridges; YOUNGSTOWN BRIDGE CO., Builders.

(9) Preference will be given to the following limiting lengths for different types of bridges:

- Spans under 16 ft. . . . . Rolled beams.  
Spans between 16 and 80 ft. . . Rivetted plate girders.  
Spans between 80 and 100 ft. . . Rivetted triangular or pony trusses.  
Spans between 100 and 150 ft. . Pin-connected single intersection trusses with straight top chord.  
Spans over 150 ft. . . . . Pin-connected single intersection trusses with parabolic top chords.

(10) The standard widths center to center will be as follows:  
"I" beams—7 ft. 2 in. center to center of beams of a group.  
Deck plate girders and stringers—7 ft. 0 in.

Deck pin-connected or rivetted trusses—Not less than 9 ft. 6 in., nor one-twentieth of span.  
Through pin-connected trusses—not less than 16 ft., nor one-twentieth of span.

(15) In through trusses the end posts must be battered, and the hip hangers be stiff members and stand vertical. Spans under 150 ft. in length shall be provided with stiff end bottom chords.

(20) All bracing shall be made of shapes, have riveted connections, intersect in each panel of through bridges, and of deck bridges having metal floor systems, and be riveted to each other, and to stringers at each intersection. When depth of truss is thirty feet or over, subtrusses and sway frames must be provided. Knee braces between posts and upper struts shall be used when depth of truss is less than thirty feet.

(26) No lateral connection shall be made with less than three rivets, with a preference for four. The distance center to center of end connection rivets in top laterals of through bridges, shall be made one-eighth of an inch less than the calculated distance.

(27) Intermediate stiffeners on webs of stringers, beams or girders, will be required whenever the ratio of the unsupported depth to the thickness is greater than sixty.

Holes are to be taken one-eighth inch greater than the diameter of rivets.

(40) When the track is on a curve, both inner and outer trusses are to be alike, and figured for the proportion of the live load given by the formula:

$$W = \frac{m + b}{2b} P$$

Where W equals load going to either truss.

- " m " the center ordinate to the curve.  
" b " the width center to center of trusses.  
" P " the live load at panel point considered.

Each floor beam and stringer is to be figured for the maximum live load to which it will be subjected.

(41) When two lateral angles intersect in a panel, each angle must be considered as a tension member, and be proportioned for the total wind shear in the panel.

(48) No material, whether in plates or shapes, excepting lattice bars, stiffeners or wind bracing which are limited to 5-16 in., shall have a less thickness than ¾ in. In through bridges no channel, whether built or rolled, shall be less than 10 in. The smallest angle allowed will be 3x2½x5-16 in.

(52) When ties rest directly on chords, the splice shall be made at a point one-fifth of panel length distant from the panel point, the side splices being proportioned to take up the maximum shear (chord considered as a simple beam) at end of panel, and the top and bottom splices each to take the maximum bending stress occurring at any point in the panel.

(70) Flange plates 14 in. or under in width shall have two straight lines of rivets. When over 14 in., there shall be four lines of rivets passing through flange angles, and two lines outside of flange angles, those passing through the flange angles being staggered, and those passing outside of flange angles being opposite to those in the inner rows.

(71) The rivets connecting legs of angles to webs shall alter-

diameter of the punch shall not exceed the diameter of the rivets by more than 1-16 in., and the diameter of the die shall not exceed the diameter of the punch by more than 1-16 in. When holes are to be reamed they shall be made with a punch ½ in. less than the diameter of the rivet intended to be used, and shall be reamed to a diameter 1-16 in. greater than the diameter of the rivet. Reamed or drilled holes must have sharp edges removed.

(105) The following material and members must be drilled or reamed in accordance with clause No. 104:

- 1st. All medium steel.
- 2d. In soft steel, members taking tension when thickness of metal exceeds 9-16 in., tension flanges of beams and girders, when metal exceeds ¾ in., compression members when metal exceeds ¾ in.

3d. Connections of stringers to floor beams and floor beams to posts shall be reamed through a templet. Riveted connections of web members in pony or lattice trusses, as well as spliced joints in tension or compression members or flanges, shall be reamed after assembling.

(117) Unless otherwise specially stipulated, the paint used will be pure red lead and commercial lamp black, mixed with pure raw linseed oil. No thinning, by means of turpentine, benzine, or other substances, and no dryer will be permitted.

(118) The red lead and lamp black shall be thoroughly mixed in the dry state, the linseed oil added, the mixture stirred to a uniform consistency and applied at once. Each gallon of paint must contain 12 lbs. of pure red lead, and 10 ounces of commercial lamp black; only a sufficient quantity for immediate use should be mixed at one time. Paint which has begun to set before application shall not be used, or if so, the entire painting may be condemned. No painting shall be done in wet or freezing weather. If shipped in barrels for field purposes, they must be turned end for end, and the paint violently agitated daily, to prevent setting.

(119) All steel or iron work must be thoroughly cleaned of all



dirt, rust or scale, and given two heavy coats of paint, one before shipment, and one after erection, applied in an even and uniform manner. Surfaces coming in contact, in riveted work and parts not easily accessible after erection, such as end bolsters, bottoms of bed plates, inner surfaces of chords and posts shall have both coats applied in the shop.

(120) When erection is done by the railroad company, the contractor shall give the entire metal work one coat of paint before leaving the shop, and ship a sufficient quantity for field application.

(121) All machine finished surfaces shall be cleaned and given a heavy coat of white lead and tallow before shipment. This is to be a substantial coat, such as used on machinery, and not a mere nominal covering.

(122) The surfaces of wood in contact with wood or iron, and counter-sunk holes for bolts and washers, must be thoroughly painted with hot tar thickened with lime. This applies to cross ties, guard rails, raising blocks, etc.

Both of these bridges have been built during the past season by The Youngstown Bridge Co., of Youngstown, Ohio, and were detailed under the direction of C. E. Fowler, Chief Engineer for that company. This company also completed six other spans built on the Midland Division during the past summer.

#### The Hopkins Railroad Library of Stanford University.

Early in 1892 Mr. Timothy Hopkins, of San Francisco, ex-Treasurer of the Southern Pacific Co., gave to the Leland Stanford, Jr., University Library his personal collection of books relating to railroads. A deep interest in the questions which affect the relationship of railroads to those whom they serve led to the gradual formation, by

or withhold permission for the building of all lines. In course of time "decisions" have been given under these laws in the courts, and have been duly reported in many volumes. And many treatises have been written with a view to reconciling the decisions with the law and with each other. It was found, too, that the ordinary processes of law failed to meet all the exigencies of the new state of affairs. Duties of an unexpected character remained to be undertaken by the government. How these duties of inspection, of direction and of ownership have been treated in various countries forms the illustrative side of the great economic problem usually termed the "railroad question," a question which has been written of from every standpoint, and with every degree of warmth, that ignorance, experience and learning make possible.

Of much greater value and importance than these theoretical products are the reports of the governmental officials of railroading. In Great Britain, at first each new question or difficulty which claimed legislative consideration was referred to a select committee of either House of Parliament. Soon this continual readjustment of committees resulted in the establishment of more permanent commissions, which in turn developed into the Railway Department of the Board of Trade. This department has acquired great power, and has exercised it mainly in collecting returns on various subjects from the companies. The result is evident in the voluminous series of reports on "accidents," "signal arrangements," "brakes," as well as many special reports on matters of particular interest. In this respect the British colonies have followed the example of the mother country, and from India, Canada, Cape of Good Hope, Natal, the di-

cations of the leading manufacturers of locomotives, cars, and the special items connected with the fitting out of the road, such as signal arrangements. Requests to the publishers of these lists and catalogues have uniformly been responded to most generously. This is also true of the railroad companies to whom application has been made for their annual reports and other literature illustrative of railroad management and finance. Although the Hopkins Library has a large number of the reports of European and other systems, a systematic effort has been made, as yet only in the case of American lines, to render the collection representatively large. It is hoped that in time the prospect of having their company permanently represented in such a collection as this will lead railroad officials to send their annual reports year by year of their own initiative.

Of railroad journals, the most important item in this literature, the Hopkins Library receives currently 51, which come from the following countries: United States 23, Great Britain 8, Germany 7, France 5, Austria 2, Italy 2, Belgium, Switzerland, Australia, New Zealand, 1 each. All these are avowedly devoted exclusively to railroads and do not include periodicals devoted to street railroads, of which there are at least half a dozen. It may be interesting to note that there are about three journals each in England, France, Germany, and Australia more than those enumerated above, as well as two in Russia, one each in Spain, Cuba, and Brazil, which are exclusively devoted to railroad literature.

Altogether at present writing the Hopkins Railway Library contains 3,800 books and about the same number of pamphlets, forming a collection very nearly represent-

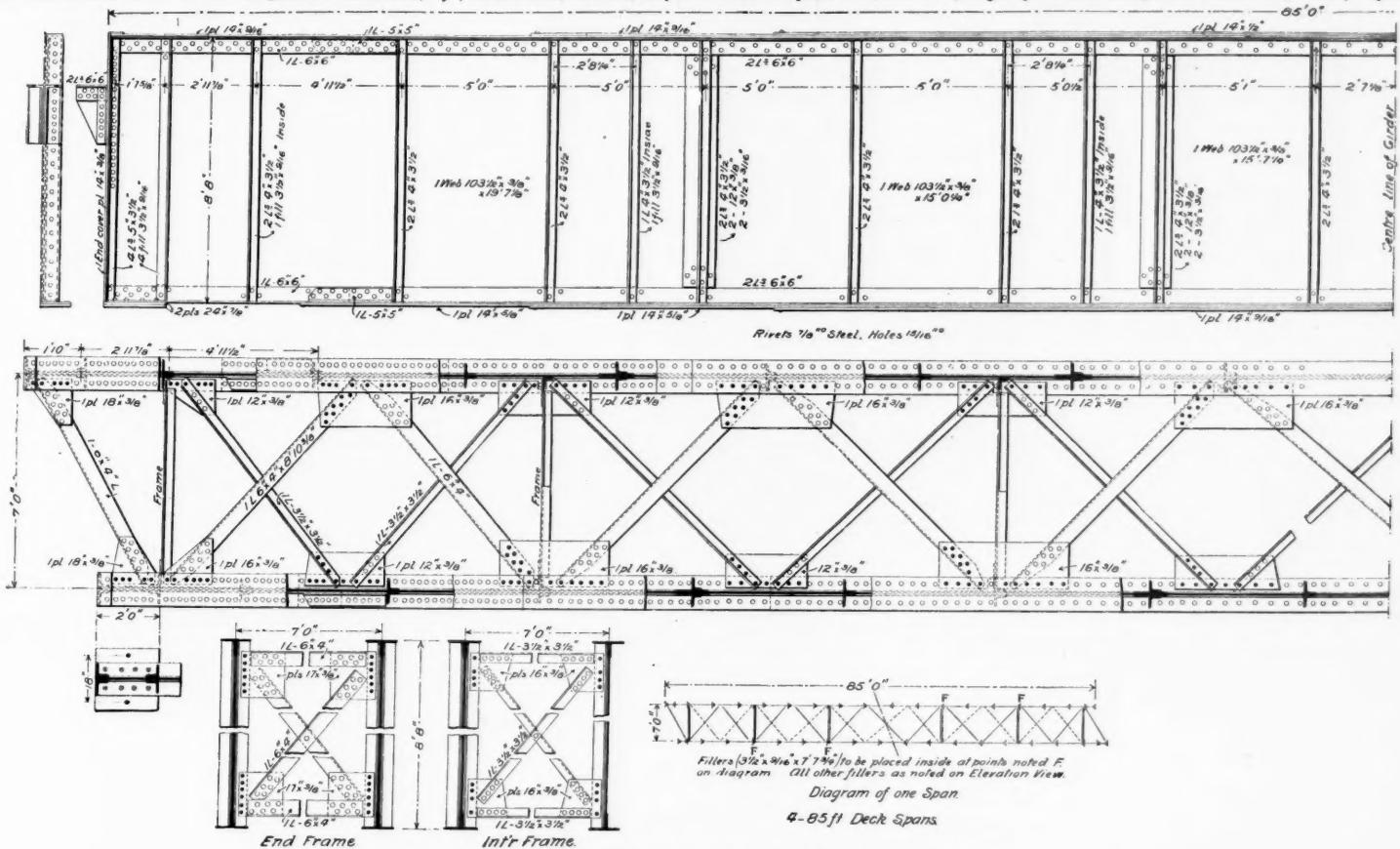


Fig. 2.—Turtle Creek Bridge, Baltimore & Ohio Railroad.

Mr. Hopkins, of a library embracing the most important works on railroad economics and management in the United States, which received a valuable addition in 1883 by the acquisition of the works relating mainly to the railroads of Great Britain, collected by Mr. P. Broughton, who had occupied high positions not only on lines in Great Britain, but in Canada and the United States. The great need of having the problem of transportation adequately represented at some such seat of investigation as a university led Mr. Hopkins to transfer his valuable collection to the Stanford University, and to make ample provision for its permanent maintenance and extension to something approaching completeness. Just what grounds must be covered in an attempt to make such a library "complete" may not at once be apparent, for the literature, on the one hand of theory and economics, on the other the result of practical working and practical needs, seems to have grown quite in proportion to the extension of the railroad itself.

The initial problem relating to railroads, both in general and in particular, is that of "location," the conditions of the road, and the country over which it is to run. Not only have the natural elements of topography, distance and resources to be taken accurate account of, but the acquired characteristics of density of population and extent of productivity. Strange to say, the literature of this important branch of the subject, which seems an inviting field for theorizing, is very meager. The establishment of railroads, among other changes introduced many new factors into the statute books of the countries interested. Laws were required to harmonize the conflicting elements introduced by this addition to civilization. From the first, moreover, governments have reserved the right to grant

visions of Australia, and from New Zealand come annually the reports of commissioners and commissions.

Many of our own States found it necessary, at a comparatively early date, to take measures for the protection of the public interest and safety. And here again the legislative committees developed into railroad commissioners, with more or less power and varying duties. The passing years have left behind them an ever increasing number of annual reports from the representatives of almost every State in the Union, reports which contain most valuable material for a consideration of the railroad development of this country. The interest of the general government is manifested in the establishment of the Interstate Commerce Commission, which is not only an investigating and reporting body but a court.

On the other hand, the activities of the individual railroads are represented by a large and varied literature. The numerous treatises which deal with the special knowledge required in laying out and constructing a railroad, are a necessary addition to a railroad library. England, France, Germany and Italy have each added their quota of general works to this division of the subject. Not only so, but it would seem that every item connected with roadbed and track must have its bevy of writers. Scarcely less extensive is the literature of railroad locomotion. The history of the origin and growth of the locomotive engine seems a favorite topic, and receives extensive support from catechisms and other practical treatises intended for instruction in the running and management of engines on the road.

For the use of technical students the Hopkins Library has endeavored to gather together, in addition to such works as are mentioned above, the trade lists and speci-

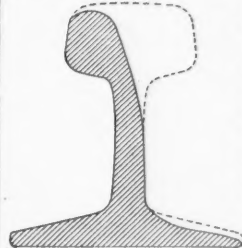
ative of the great industry of railroad transportation. A catalogue is in preparation and it is hoped will soon be in circulation.

FRED J. TEGGART.

#### Another Case of Rail Conversion.

In our issue of Nov. 23, 1894 (page 801), we gave a brief note of a case of corrosion of rails in a tunnel. The engraving given with that note showed a very material reduction in the area of the rail section, after five years' service in the Musconetong tunnel on the Lehigh Valley Road. In this case the loss of material in the head was largely attributable to wear; but the heavy loss in the rail base was partly due to friction between the rail and tie plate or tie (enhanced by the free use of sand in the tunnel, called for by the ever present excess of moisture) acting with the corrosive agents.

A more remarkable case of corrosion of rails has recently been brought to our attention. This case, found on one of the leading western roads, shows the corrosion by acids from coal, and not by fumes. A large number of loaded cars of bituminous coal had come into a certain point on the road alluded to and were set on a side track. The loads came in wet from a rain and stood there just one month, standing on rails that were laid one year previously. The accompanying engraving shows a rail section taken off immediately after the loads were removed.





The acids dripping from the wet coal during those 30 days had produced this remarkable result. It will be seen that the larger part of the head, a portion of the web, and a portion of the upper part of one flange were eaten away. This indicates pretty rapid action for one month, and the dripping of pretty strong acids. A reliable official of the road in question vouches for this phenomenon, however. The question now arises as to whether similar experiences have been met with elsewhere on other roads. And the further question arises as to whether, if rails under such circumstances suffer so seriously, what must be the effect upon trucks, wheels and other metal parts of coal cars. The illustration is reproduced from a circular now being issued by the Wadsworth-Howland Co., paint manufacturers, of Chicago.

#### Mr. George S. Morison—President American Society of Civil Engineers.

Mr. George S. Morison, who has just been elected President of the American Society of Civil Engineers, has long been an important figure in the profession in which he has arrived at the first rank, and has been a member of the Society since 1875. He was born in New Bedford, Mass., Dec. 19, 1842, of New Hampshire, Scotch-Irish stock. His father was a Unitarian minister, John Hopkins Morison. Most of his boyhood was spent at Milton, near Boston, and he fitted for college at the Phillips Exeter Academy. He graduated from Harvard in 1863, studied law, receiving the degree of LL.B. in 1866, and was admitted to the New York bar in the same year, but never practiced.

His first engineering employment was on the Kansas City bridge across the Missouri River, under Mr. Octave Chanute, Chief Engineer, which work he entered upon in October, 1867. He remained in Kansas City until 1871, and the next two years was Chief Engineer of the Detroit, Bel River & Illinois Railroad, living in Detroit. In April, 1873, he became Resident Engineer of the Eastern Division of the Erie Railroad and Principal Assistant to Mr. Chanute, who was then Chief Engineer. He remained on the Erie until November, 1875, during which time he rebuilt the celebrated Portage viaduct.

The next ten years were occupied largely in consulting work on railroad properties, during which time Mr. Morison was regularly connected with the house of S. G. & C. Ward, the American agents for Baring Brothers & Co. In this period he served as director on the St. Louis, Iron Mountain & Southern Railway four years, the Eastern Railroad of Massachusetts ten years, the Maine Central eight years, and the Ohio & Mississippi eight years; this latter directorship having extended to 1892. For five of these ten years, that is, up to 1880, he was a member of the firm of Morison, Field & Co., bridge contractors, but he retired from this firm in order to follow engineering work proper, rather than contracting. In 1887 he removed his residence to Chicago, retaining an office in New York, and for two years he was in partnership with Mr. E. L. Corthell under the firm name of Morison & Corthell. During this partnership he took time to make a trip around the world.

Mr. Morison's greatest reputation has been made in the building of bridges across the Missouri and Mississippi rivers. He built as chief engineer nine bridges across the Missouri in the interval from 1887 to 1893. The last of these were the bridges at Bellefontaine, Mo., and Leavenworth, Kan., both of which were completed in 1893. He built three bridges across the Upper Mississippi in the four years 1890 to 1893 inclusive, the latest of these being the Alton bridge, and one of them, the Burlington bridge, having been rebuilt. He was also Consulting Engineer of the St. Louis Merchants' bridge. The greatest of his bridges, however, is that across the Lower Mississippi at Memphis, completed in 1892. This has a main span 790.42 ft. long, and two river spans of 621 ft. each. The total length of the bridge proper is 2,597 ft., and including the viaduct approaches, 4,988 ft. There are but two bridges in the world with longer trussed spans; the Forth bridge, with two spans each, 1,710 ft. long, and the Landsdowne bridge (Sukkur) with one span of 820 ft. Only one other bridge has reached such a great depth by pneumatic caissons, the Bads bridge at St. Louis. The table below gives the depths reached and the greatest immersion while work in the caissons was in progress.

	Below l. w.	Below h. w.	Immersion.
Memphis . . . . .	96.2 ft.	130.8	108.
Bads . . . . .	94. "	135.5	109.7

In this work singular difficulties were met by highly original methods.

Mr. Morison also built a bridge across the Ohio River at Cairo, the longest metallic structure in the world; one across the Willamette, at Portland, Ore.; one across the Snake River, at Riparia, Wash., and one across the St. John's River, at Jacksonville, Fla. Besides these he has built a good many smaller bridges and viaducts for various companies. The aggregate length of his large bridges is about five miles. Within the last year he served as one of the Board of Engineers appointed by President Cleveland to report on the project for bridging the Hudson River at New York.

The Missouri is one of the most troublesome of all the

great rivers of the world. Its swift current, changing channel and treacherous bottom unite to make it the dread of engineers. In the nine great bridges which Mr. Morison has built over that stream unexampled combinations of difficulties came up. In this work, as in all the other bridge work which has been specified above, on streams offering a great variety of physical conditions, Mr. Morison was the actual chief engineer, controlling everything, to the last detail, and he has shown himself to possess that combination of knowledge of the work of others, patience in the study of the details of his own work, fertility of resource, courage and soundness of judgment, which unite to make the engineer of the first rank.

But with untiring activity of mind Mr. Morison's engineering work has spread over a considerable field outside of bridge work. As consulting engineer or chief engineer he has given much attention to the location of railroads and particularly to the design of great terminals and yards, and to the study of the conditions, relations and earning capacity of different railroad systems.

In 1888 Mr. Morison was chosen a trustee of the Phillips Exeter Academy, which office he still holds. He is a member of the American Society of Civil Engineers, Institute of Mining Engineers, Society of Mechanical Engineers and the Western Society of Engineers, also of the Institution of Civil Engineers, London. He is an Associate Fellow of the American Academy of Arts and Sciences, and a member of the following clubs: The



Mr. George S. Morison.

Chicago and the Union in Chicago, the University, the Engineers and the Down Town in New York, the Union and the St. Louis in St. Louis.

#### Electric Conductors in Brooklyn.

The Board of Commissioners of Electrical Subways of Brooklyn has just issued its annual report covering the past year. On December 31, there were 15,772,428 miles of electric conductors of all kinds, of which 6,447.5 miles were underground or on elevated roads. Permits to the number of 756 were issued for construction and repairs.

The first electric wires laid in underground conduits under the direction of the first Commission were drawn into the ducts in June, 1886. A temporary stop was put to this work on December 17 of the same year, by a resolution passed by the Board of Aldermen directing the Commissioner of City Works to refuse to grant permits for opening the streets for the purpose of constructing electrical subways. This deadlock, however, was broken by the courts in October, 1887.

The existence of this first Board terminated October 31 1889, at which time 3,007 miles of conductors had been placed in the ducts and 768 miles carried upon the elevated roads. The present Board came into office in May, 1892. The total length of wire now in underground conduits is more than twice as great as the total of electrical conductors in Brooklyn when the first Board was organized.

Fully 400 miles of telephone wire have from various causes been rendered worthless. About 300 miles have been rendered useless during the past year through the corrosion of the lead covering of the cables, largely due to electrolytic action of the discharged electricity from the trolley roads. Some illustrations of this evil and its effects were given in the *Railroad Gazette* of April 6, 1894. Further illustrations accompany this report, together with the statement that the areas within which such injury can be done are clearly defined, and that quite certain means of arresting the destruction have been found.

The city wires are yet mostly aerial, awaiting an appropriation to defray the expense of an underground system.

A notable event of the year just closed was the beginning of the construction of conduits for the high tension arc-light conductors. An aggregate length of 21.2 miles of duct is prepared to receive conductors. Cables will be drawn in in favorable weather during the winter, and construction of conduits continued in the spring.

The District Telegraph companies employ only aerial lines, supported largely on house tops. To insist on the burial of these wires would, in the opinion of the Board, abolish the system owing to the expense of buying the wires. Certain telephone lines in populous districts are permitted to use poles for the same reason.

In some places in Brooklyn the limit of occupation of space under the roadway is nearly reached. It is quite so in the case of Grand street, in the Eastern District. The report refers to a plan for a general subway designed to contain pipes and wires of all kinds, excepting, perhaps, the sewers, which is now being advocated. Such a scheme would involve the removal of all of the present pipes and subway systems and their rebuilding in the new conduits, which is impracticable. Such a plan is, however, recommended for suburban districts where the underground constructions are not yet begun.

A full report of an electrical survey of the city, made by John A. Barrett follows, accompanied by a map showing the districts of Brooklyn most affected by electrical currents from the trolley lines. From this we make the following abstract:

Mr. Barrett commenced a survey of some of the subterranean electrical conditions produced by the operation of trolley lines, Oct. 5 last. A considerable part of the time and labor in this survey has been spent in securing measurements of the electrical status of the public water pipes by tests, made chiefly at the street hydrants along the lines of the trolley roads. Differences of potential were taken between hydrant and rail, between hydrant and at least three earth points, and between the same earth points and the rail; and in some instances between hydrant and gas pipes and between hydrant and elevated railroad structure. The figures obtained representing differences of potential between the hydrant and the earth, or conductors buried in the earth, correspond with the conditions of electrical pressure acting either from or towards the water pipes within a limited distance of the hydrant. A current of electricity entering the pipe from the earth does not promote the corrosion of the pipe at the surfaces by which it enters. If such a current has any material influence, it rather retards natural corrosion. It is where a current of electricity passes from the surface of a pipe into the earth, or into any wet or watery conducting medium that the corrosion of the pipe is actively stimulated. Consequently, where the electrical pressure is toward the hydrant, the water pipes in that vicinity are regarded as comparatively safe for the present from damage by the trolley currents; but when the direction of the pressure is outward from the hydrant the neighboring water pipes are believed to be under a liability to accelerate corrosion. In general the conditions existing in Brooklyn concerning

the trolley earth currents are similar to what are reported from other large cities. The single trolley is the only system in use in Brooklyn, the positive pole being connected with the outgoing wire. The current goes from the trolley wire through the car to the car rail, through which it seeks a return to the power station, and in its return distributes itself naturally over the several paths offered.

With the proper bonding of the rails and the erecting of special return feeders, the principal part of the current harmlessly follows these conductors to its source. But it is found that even with the most extensive system of return conductors provided by some of the Brooklyn roads, the potential of the rail throughout the central portion of the city and in districts remote from power stations is generally higher than that of the earth and water pipes, and that consequently there is in these districts a continuous passage of current from the rails through the earth to the water pipes. The places where the accumulated current chiefly tends to leave the pipes are found to constitute well defined districts, generally immediately surrounding power stations, since here the short and heavy negative feed wires from the rails to the generators tend to lower the potential of the rails below that of the neighboring pipes.

It is then the rule, briefly stated, that electricity is flowing to the water pipes from the rails in portions of the city remote from power stations and is passing along the pipes towards the respective power stations and at points mainly located within districts near the power stations, the electricity which has been gathered throughout the more distant territory and brought so far on its way to the power stations, is flowing from the pipes through the earth to the rails and other short paths to the generators. This fact underlies and indicates the means which are serviceable against damage by the trolley earth currents.

An important part of the report is devoted to corrective methods. The first thing to be done is, as far as practicable, to keep the railroad electricity off the pipes in all those regions where there is a tendency of the current to overflow from the rails to the pipes. The one method



by which this overflow may be effectually diminished is to provide a more liberal system of return conductors. The limit to which the perfection of the return system should be pushed ought to be fixed only by considerations of reasonable cost. After all this has been done there will still be a large overflow from the rails which will be collected by the pipes and conveyed by them to points where the conditions favor its discharge again into the earth. The second thing is to locate by careful investigation the points where this large and unavoidable residue of earth current tends to leave the pipes, and by a system of special return wires directly connected at brief intervals to the pipe mains, to draw off as much as possible of the accumulated electricity harmlessly from the pipes and thus to obviate the electrolytic action which is so re to accompany the passage of the current directly

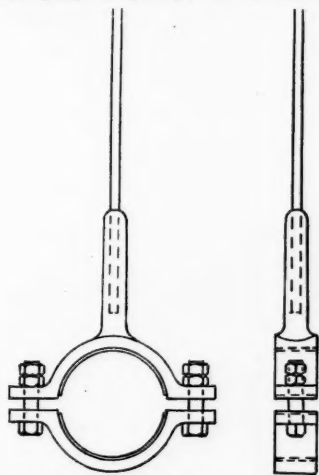


Fig. 1.

from the surfaces of the pipes into the earth. These two methods of treatment have frequently been proposed.

In general the attachment of lead wires to pipes in the danger districts should not be undertaken until an adequate system of outlying returns has been provided by the railroad companies. The pipes in the vicinity of power stations may be relieved of the unavoidable overflow by lead wires directly applied after all that is practicable has been done to convey back the railroad current to the power station by proper return conductors. Under these conditions the railroad companies will be prevented from relying upon the underground pipes, particularly the water pipes, as a material and proper part of their return systems, and the pipes, so far as regards the principal circulation of trolley currents, would virtually be safe.

Fig. 1 shows a form of clamp made under the direction of Mr. M. G. Starrett, chief electrician of the Brooklyn Heights road, which was used in making attachments to water mains in certain portions of Brooklyn for experimental purposes. The collar is of wrought iron in two parts, five-eighths of an inch thick and two inches broad; the two parts are drawn together by three-quarter bolts, with two nuts to each bolt, the collar being previously turned out upon its inner face to one-quarter of an inch larger than the diameter of the pipe to which it is to be applied. Midway in one part, is formed a lug into which is brazed a No. 00 copper wire.

In applying the connection the pipe is carefully bright-



Fig. 2.—Corrosion of a Copper Pipe.

ened all around with a file; a strip of bright lead five thirty-seconds of an inch thick and two and one-half inches broad is laid around the pipe, and the collar is clamped down by the bolts until the lead gasket is mashed into the inequalities of the pipe. The lines of junction between the collar and lead pipe are thickly painted over with "P. & B." mixture, then completely taped over and again painted with "P. & B." upon the tape, after which the whole is thoroughly packed in with good cement.

Several photographs of sections of iron, copper and lead pipes which have been destroyed by electrolytic action accompany the report. Fig. 2, which we reproduce herewith, represents three of these specimens. The two rings are sections of an iron pipe corroded at a screw joint. The one on the right shows the normal thickness only 1½ in. from the joint; the other shows the effect of the current at the joint of another section. This was a water supply pipe 1 3/8 in. outside diameter. The large cut in this figure is a piece of copper drip pipe from the same locality. It had an outside diameter of one inch and was reduced to the condition shown in 17 days. Fear is expressed for the safety of pipes leading into the

bay owing to the difference of potential between the trolley tracks and the water. The corroded end of this pipe was 100 yards from the trolley track but was immersed in the bay.

Although no mention is made of the fact in the report of the Commission, yet it is believed that the pipes running from the foot of Sackett street, South Brooklyn, to Governor's Island are in danger of corrosion. The chief electrician of the Brooklyn Heights trolley, which road is the one to be held responsible for such destruction, denies the existence of the danger, claiming that it requires a difference in potential of at least 1 3/10 volts to cause electrolysis; but it has been proved that even a small fraction of a volt is harmful.

#### The Metropolitan System of Fire Proofing.

The Metropolitan Fire Proofing Co., of Trenton, N. J., the controlling interest in which is held by the New Jersey Steel & Iron Co. of that place, has recently been

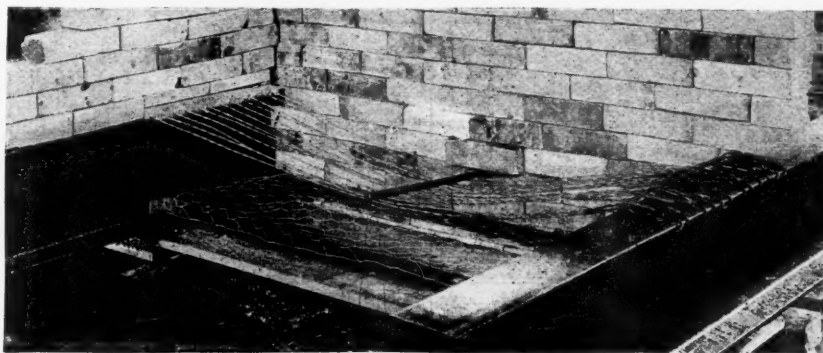


Fig. 1.—Metropolitan System of Fire Proofing

formed for the purpose of introducing the old "Manhattan" system of fire proofing. The method of applying this system to floor and ceilings of buildings is shown by the accompanying illustrations.

For laying a floor-plate, cables, each composed of two galvanized wires, twisted, are placed at given distances (which vary with the loads to be provided for) across the tops of the beams as in fig. 1. A uniform deflection between each pair of beams is obtained by passing these cables under a bar placed in the center of the spans. Forms or centers are placed under the cables which then receive the composition, made principally of plaster of Paris and wood chips. This mixture solidifies in a few minutes after which the forms are removed, leaving a uniform and level working floor as shown in the left of fig. 2.

A ceiling-plate is obtained by placing iron bars upon the lower flanges of the beams and laying thereon a wire netting, as in fig. 1. Centers are placed one inch below the beams and the composition is poured thereon, after which the centers are removed, leaving a flat ceiling ready for plastering as shown in fig. 2, right. This ceiling is itself capable of carrying considerable weight, but is independent of the floor-plate; consequently if the floor-plate is deflected by an overload, the ceiling plate is not disturbed. Pipes, ventilating tubes, wires, etc., may be placed in the hollow space between the floor and ceiling-plates.

The company claims that one of the principal features

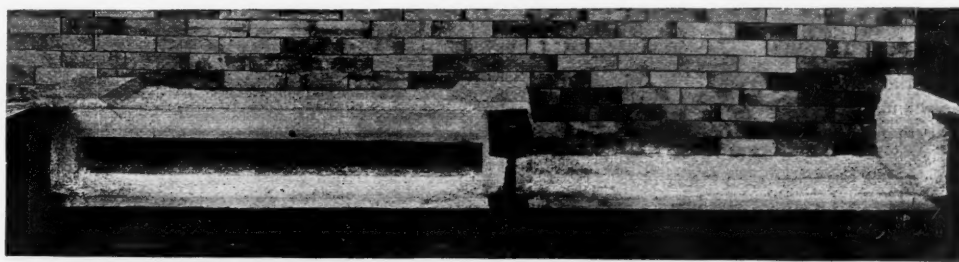


Fig. 2.—Metropolitan System of Fire Proofing.

of the material is that it protects the beams from the effects of heat, the webs of all beams being covered with about three inches of the composition. Severe fire-tests have shown that when exposed to flame for a long time the Metropolitan composition is attacked to a depth of from three-sixteenths to five-eighths of an inch, the remainder being unaffected; and when water is thrown upon it the mass does not crack or fly. Neither is it affected by being thoroughly saturated with water.

Next to its fire-proofing qualities and strength the most important characteristics of this system is its lightness, which diminishes to a great extent the loads to be carried, thus saving a certain proportion of the iron or steel of a structure, and lessening the loads to be carried by the foundations, under ordinary conditions, by, it is claimed, about 25 per cent.

The Metropolitan system is in use in the American Express Co.'s stables, the Hotel Imperial and several other large buildings in New York and elsewhere, and has been thoroughly tested by both fire and water for the building and fire departments of New York, Boston, Montreal and other cities.

#### American Society of Civil Engineers.

The annual meeting of the American Society of Civil Engineers was held in New York on Wednesday and Thursday of this week. We have already printed the programme, and can now report only the proceedings of Wednesday morning.

The event of much the greatest interest was the election of officers which resulted as follows:

*President*, to serve one year, George S. Morison, Chicago, Ill. *Vice-Presidents*, to serve two years, Desmond FitzGerald, Brookline, Mass.; Benjamin M. Harrod, New Orleans, La. *Treasurer*, to serve one year, John Thomson, New York City. *Directors*, to serve three years—Non-resident, George H. Benzenberg, Milwaukee, Wis.; George H. Browne, Pittsburg, Pa.; Robert Cartwright, Rochester, N. Y.; Fayette S. Curtis, New Haven, Conn.; resident, Augustus Mordecai, New York City, and Charles SooySmith, New York City. The Secretary will

be appointed by the Board of Directors under the new constitution.

The special committee on standard time, by Mr. Sanford Fleming, reports a continued movement to secure a change of the beginning of the astronomical day to agree with that of the civil day. This would, it is believed, have an important bearing on the long-standing effort of the Society to spread the use of the 24-hour notation.

The Committee on International Standards for the Analysis of Iron and Steel reported progress. A sub-committee of five analyzed five samples of steel for phosphorus. The greatest discrepancy was 0.009 per cent. The method of each member is given at length. The conclusion is that it is, to say the least, interesting, that methods differing so widely in principle, in strength of solutions, and in manipulation, should give results so closely agreeing, and it is perhaps not too much to say that with proper care and skill the determination of phosphorus in steel is at present, so far as accuracy is concerned, in a very satisfactory condition. The amount of labor and time required by the various methods given is, however, too great, and it is hoped that the work of the sub-committee will result within the next six months in a method which is equally as accurate as those above described, and which will be very much less laborious, and give results in very much less time.

The Committee on Uniform Methods of Testing Materials offered a majority and minority report which will be published later.

The Committee on Amendments to the Constitution also made a report which will be published in a later issue.

The annual report of the Board of Direction shows a total membership of 1,808; the net gain in the year was 75. The loss by death was 26. The Norman Medal for 1893 was awarded to Desmond FitzGerald for the paper on Rainfall, Flow of Streams and Storage. The Rowland Prize for 1893 was awarded to Capt. W. M. Black for the paper on Harbors on Our South Atlantic Coast. These awards we have already announced.

The Committee on the Norman Medal for 1894 made the award to Alfred E. Hunt, of Pittsburg, for his paper on "A Proposed Method of Testing Structural Steel." That on the Rowland Prize made the award to David L. Barnes for his paper on Distinctive Features of American Locomotives.

#### Lake Ore Carriers.

The Johnson Company, of Lorain, O., is having built five barges, one with motive power, for carrying steel to tidewater markets from Lorain via the Lakes and the canals. The boats are to be built of such size that they can pass the locks. They will carry about 200 tons each.





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#### EDITORIAL ANNOUNCEMENTS.

**Contributions.**—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contract for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

**Advertisements.**—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

Economy is often an expensive and wasteful luxury. This delphic utterance we do not put out as new, and we claim no copyright on it, but an instance which goes to prove it has lately been brought to mind. The *Iron Age*, in writing of the low cost of manufactures of iron and steel, credits to Mr. William Garrett, of Joliet, the inventor of the Garrett rod mill, the statement that wire nails are sold so cheaply that if a carpenter drops a nail it is cheaper to let it lie than to stop and pick it up, and it is claimed that one keg out of five is never used, but goes to waste. The *Iron Age* man, therefore, goes to figuring, and assuming that it takes a carpenter 10 seconds to pick up a nail, and that his time is worth 30 cents an hour, the recovery of the nail that he has dropped would cost 0.083 cent. The money value of an individual six-penny nail is 0.0077; that is, it would not pay to pick up 10 nails if it took 10 seconds of time worth 30 cents an hour. As the "provincial" editor might say, we are not a very quick man, but we find that we can pick up a nail on a moderately clean floor in five seconds. Assuming that this is a better average than the 10 seconds of the *Iron Age*, and that we are paying the carpenter only 25 cents an hour, it will still cost to recover the nail .0347 cent, which is nearly five times the value of an individual nail. So the *Iron Age* has a considerable factor of safety in its estimate, and we are bound to believe that it will not pay to pick up nails. The same principle has been brought out two or three times in the entertaining discussion on Mr. Barr's interesting paper on the uses and abuses of the scrap pile. And by the way, this paper and the discussion of it make some of the best material that has been produced in any of the railroad clubs for a good while. It is not pretentious; neither the author of the paper, nor those who discuss it parade their learning; but they have brought out a mass of human experience which is worth volumes of dogmatizing. Perhaps the success of this paper will encourage other men to take pages out of their own note books and put them before the world in the same simple way.

If you use an old freight engine, with a cow-catcher, for switching, you must take care to notify the brakemen that they have been temporarily deprived of the usual foot boards and handholds which all regular switching engines are provided with. This looks like a very exacting rule, but it is the law, as laid down by the Supreme Court of New York in a case where such a change of engines was made and a brakeman was injured. It is the eleventh case in our railroad law column this week. There is another case, the sixth, in which yard masters will be interested. The decision, by the Supreme Court of Michigan, is undoubtedly just, but it should be remembered that it means strictly what it says, and no more. If a yard were close to a street with no fence between, probably the Court would very readily approve of the punishment of the railroad by a jury if a man were injured, even though he might be in some sense a trespasser. Again, a yard often extends alongside of or near to a passenger platform; it would not do to assume from this decision that it would be right to move freight cars in such a place without a man on them, or even without a bell or other "good and

sufficient" warning to people to get out of the way. We mention this point, because we have seen cases where such a hint would be very appropriate. The uselessness of keeping on the books rules which are not enforced is shown up in the courts quite often, and the decision in the fourteenth case is only one of many of the same kind. A railroad lawyer may approve of such a rule as a sort of club with which to browbeat juries, but a railroad superintendent, if he desires to maintain discipline by enforcing reasonable obedience, will want nothing of the kind. The lawyer might make use of such a rule in court by claiming that the employee ought to have recognized its moral influence, as an indicator of his employer's wishes, whether he were bound by it technically or not; such an argument might influence a jury; but the wise superintendent wants only such rules as the men can be made to recognize as are reasonable. If they do not believe it to be reasonable it will be hard to enforce it.

There are those who say "if you see it in the *Sun* it's so," and there are others who say, "if you see it in the *Sun* verify it." Mr. Dana himself says that newspapers are very much like human nature—sometimes right and sometimes wrong. In this conflict of authorities we must judge of the accuracy of what is published in that journal by the light of other knowledge, and so judging a report of a discussion in a conference of ministers held the other day in New York, we conclude that we can take that report as fairly accurate. These gentlemen pitched into Dr. Depew and the New York Central Railroad very savagely, because of the action of the road in withdrawing the clergyman's half-rate ticket, and especially because Dr. Depew is said to have said that the ministers sometimes sell their tickets to scalpers, so defrauding the company. One minister considers this interview a reflection on the honor of the entire American ministry, and believes "that we ought to resent the stigma cast upon the cloth." He told the following story. Whether he got it from Dr. Depew or not we do not know. It appears that a minister entered a train at Troy in a queer condition, the conductor looked at his clerical ticket, and said, "you ain't a minister." "The hell I ain't," replied the clergyman. We do not tell this story on our own authority, but that of the Reverend Dr. Palmer, as reported in the *Sun*. Dr. Palmer went on to say that ministers are not paupers, that they do not ask for cheaper rates, because they are not so well off as some other men; they are perfectly able to pay their own fare, but he believes that the ministry of this country has the moral force of a police organization, and he says, "if we succeed in keeping but three switchmen from drunkenness, and so prevent them from switching trains and people to disaster, the railroads can well afford to let us have half-rates." And yet we have no doubt that Dr. Palmer is very severe indeed upon Superintendent Byrnes, of the New York police force, because Mr. Byrnes acknowledges that he permitted Jay Gould to make him rich for doing his simple duty. Old Aesop got on to a great many fundamental facts, and one of the most fundamental of them is that it makes a great deal of difference whose ox is gored. Dr. Lennon, in the same debate, urged a boycott of the New York Central Railroad, and said, "we must give the officials of that road distinctly to understand that we will do all in our power to turn business from that railroad to another unless we are rightly treated. They must learn, as well as any other railroad, that the American ministers do not propose to be trifled with or insulted." We should be inclined to think that the enterprising reporter had misrepresented Dr. Lennon, but that we have seen letters from clergymen to railroad managers making exactly this threat, because passes were refused to them. Dr. Palmer explained that the company said that one scalper had offered \$100 for a clerical card, and that one minister had said that a scalper had offered to buy his half-rate ticket to Chicago for \$10, and when the minister declined to sell his ticket, the scalper said, "they all do it," and showed him six clerical tickets.

We are not altogether decided as to what it would be best to do in this matter. The *Sun* has said that no good minister will take another man's money out of his pocket without his consent. This seems obvious enough, as a general statement, and we suppose that the specific application of it is to the case of the minister who takes the money of a railroad stockholder, by traveling at a reduced rate, or who by traveling at a reduced rate raises the average charge to all those who pay full fare. Such assumptions are often made, but they will not hold water. In the first place, the stockholders have never, so far as we know, protested against

reduced rates to ministers. We suppose, indeed, that the great majority of railroad stockholders would be glad to have ministers travel over their roads at reduced rates, or even free. As to the financial results—as to whether a stockholder is made poorer or another man's fare is made higher because a minister travels at a reduced rate, that is debatable. It is a fundamental fact that if you can get new traffic to move, and if this traffic can be moved at something more than the actual cost of moving it, you will make money by it. This seems apparent enough. The difficulty of applying this principle to passenger business has always been the difficulty of assorting this business. Now it is quite possible that by putting ministers in a class by themselves, and giving them a low rate, a volume of new traffic may be created which will be actually profitable. We have not a word to say as to the effect of this classification on the minds and characters of the subjects of it. As to the trouble with scalpers, the roads can stop it if they see fit, of course; for it is only necessary to limit the certificates strictly to clergymen, shutting off the pseudo "religious workers" and the thin frauds which the passenger men have themselves lugged in under cover of the clergy privilege. As we have just said, it may be profitable to the passenger department to carry clergymen for nothing; but if railroad directors wish to stick to rigid principle, we advise them to follow the example of the New York Central directors and make their contributions to religious objects through the regular contribution box on Sunday.

#### Light Railroads in England.

Is the Englishman at last to be permitted to build cheap railroads on his own soil? Will the beneficent Board of Trade allow him to kill himself and his brother with derailments and collisions, and with smashing wagons at unguarded crossings and running over bulls on unfenced right of way and running down the casual wayfarer who takes a nap on the track out of pure cussedness? Will the Englishmen be allowed to do all this just as if he were a reckless and ignorant Yankee? It really looks as if there might be a change. The Board of Trade conference has led to no end of discussion, and there are positively startling signs of letting down the bars. We notice, for instance, in a recent number of *Engineering*, these heretical sentiments: "A great deal too much has been spent in times past upon the donkey, the cow and the old lady. The original promoters of railways had to sacrifice a great deal to popular prejudice in early days in order to get their Acts, and the precedents then set have grown into sacred custom. It is doubtful whether all the elaborate fencing and guarding of railways does not in some measure defeat its end, for the more people are looked after the more careless they become. At any rate, we cannot afford to let a great national want remain in order to save a few careless people the trouble of thinking for their own safety. There must be some sort of proportion even in the care for human life." According to *Transport* Mr. Bryce, who "opened the conference with a singularly able and judicious speech . . . pointed out in the most straightforward language that safety was after all a luxury that might be paid for too high." Precisely so; but the American has suffered years of contumely because he has insisted upon keeping a certain sense of proportion in building his railroads.

It appears to us at this distance that the Board of Trade requirements must have impeded the development of cheap railroads in England to the serious injury of the manufacturer, the miner and the farmer, and especially the farmer. We are told that English "farmers within forty or fifty miles of big cities cannot sell their produce, largely because of the lack of transport. The produce is even at times allowed to rot on the ground because it costs so much to put it into the hands of the consumer. On the other hand, we are bringing grain, fruit, meat, cheese and provisions of various sorts from the furthest ends of the earth. It pays the Australian fruit grower to send his handsome but poorly flavored apples to London whilst thousands of trees of the most delicious English fruit are going to decay because the farmer cannot get sufficient return for his time in keeping them in shape and free from vermin." This is, indeed, a melancholy picture, but in the United States, where the railroads have never been burdened with Board of Trade requirements, and where, until very recently, they have not suffered from the misdirected efforts of public men to run them according to theory, the farmers of the eastern States are being ruined by the farmers of the West. The decline in the price of land in New England is as serious as it is in old England. Farmers who live within 100 miles of New York cannot put their butter into New York stores any cheaper than those who are 1,200 miles away. This is a tremen-



dously great and complicated question, and involves a good many phases of transportation.

But still there can be little doubt, we suppose, that England really needs a relaxation of the Board of Trade requirements with regard to railroads, and (but of this we are less certain) some change in the method of getting parliamentary sanction for new railroads. *Engineering* attributes to Mr. Bryce the statement that the cost of getting a private bill through Parliament is a guinea a minute, but the average number of minutes is not stated. We remember that a number of years ago the same journal made the estimate that the parliamentary expenses of the English railroad system as a whole have amounted to about \$10,000 a mile if divided proportionately among the railroads now built in the Kingdom. That is to say, this item alone has been about one-sixth of the total cost per mile of building and equipping completely the railroads of the United States. We do not know how just the figure is, but would like to know. We have used it a good many times in the public prints and have never seen it challenged, and so perhaps it is as good a figure as can be made.

Probably this element in the cost of building an English railroad is too great, but we are bound to say that, take it all in all, the rigid English system by which a new railroad project can only be carried through Parliament at great cost and stress has very decided merits, and it remains to be proved that the United Kingdom is not richer to-day because of the very rigidity of that system. It has undoubtedly prevented the waste of a great deal of money in the building of unnecessary lines. It has undoubtedly saved a great many people from being swindled out of their money by promoters of lines that never have been built, or which it was never intended to build. So on the whole, there is some presumption in favor of the English practice in this respect, and at any rate the burden of proof is upon those people who wish to make it easier to get parliamentary sanction.

Another aspect of the question which strikes us as being very curious is that so many conservative English journals are strongly inclined to favor public aid in the form of cash for the proposed light railroads. Mr. Bryce says that it would be a waste of time to discuss the possibility of financial assistance from the national treasury. On this point he believes the mind of Parliament is absolutely settled; and yet so careful a journal as *Engineering* says "Mr. Bryce has learned the lesson of office quickly . . . It is sufficient excuse for legislators to avoid a responsibility if the carrying of it out threatens trouble;" from which we judge that that journal would, if it saw public opinion drifting that way, be quick to support the plan of national aid; and pretty nearly the same attitude is taken toward aid by the counties and parishes. The *Statist*, a financial journal of considerable importance, has come out squarely in favor of aid to these light railroads by the national treasury, explaining, however, that it is not a socialist paper and does not propose to be called a socialist, but is not afraid of hard names, having endured them before. All of this seems to us very strange and even somewhat bewildering, and indeed we would counsel our contemporaries not to count too strongly on the popularity of any plan of public aid, either by the nation or by the counties. We do not believe that the great, sober, sturdy sense of the English nation will be suddenly changed in this respect.

Naturally, the question of the gage comes up, and we would urge very strongly upon the Englishmen the importance of sticking to the standard gage. The saving in cost of construction and equipment is very delusive as between the standard gage and a gage wide enough to be of considerable practical use. Into this part of the argument we may go at greater length in a later issue, and we shall not stop to develop it now. But whatever saving there may be will be swallowed up over and over again by the cost and inconvenience of a break of gage. The rational way to develop the light railroads of England is as feeders to the existing heavy lines, and the economical way to do it is to make them of such gage that the rolling stock can run freely from one set of lines to the other. England is full of locomotives and of freight cars that are not too heavy to run on very light lines, provided the speed is low, and that are yet fit to run at high speed over heavy lines; and it is in the maximum utilization of this rolling stock and in the maximum freedom of interchange of traffic that the maximum return from the investment in the light railroads is to be got, not only in earnings but in service to the people.

It is quite true that there is a set of people who advocate building the new light railroads on a narrow gage for the very reason, among others, that the break of gage would prevent any amalgamation or combina-

tion of the new roads with the old ones. It is the argument of these people that the new light railroads would finally be developed into systems by connecting the detached lines and groups, and that then there would be two great competing systems between which there could be no combination. The mere statement of this argument would seem to carry this answer. When the new light railroads are connected up into long lines they cannot possibly compete with the old railroads in speed or facilities or rates. They cannot compete in speed because they will not be built or signaled or equipped for high speed. If they are they will cost pretty nearly as much as the existing railroads have cost for the same items. They cannot compete in facilities because they will not have the great yards and terminals unless they pay for them at great cost. They cannot compete in rates because they will not have as high efficiency, and the unit of transportation will cost more in proportion to the price got for it. This, we are aware, is a sweeping statement which should be demonstrated; but we do not hesitate to put it out without argument as giving a good fighting ground for the narrow gage men.

Furthermore, only a charter provision forbidding the sale of the new roads to the old ones, and forbidding combinations between them could insure the development of the competing systems. The natural fate of these light railroads would be that which has overtaken the canals; they would pass under the control of the strong railroads either because they were valuable feeders or to keep them from being troublesome competitors. In the latter case the end might be worse than the beginning. To the other burdens of the existing railroads would be added a new one of unprofitable lines; and this is the burden which has broken the backs of many of our own corporations.

#### Speed-Limits For Electric Street Cars.

The State Railroad Commissioners of New York gave a hearing in Brooklyn last week on numerous complaints concerning accidents on electric street railroads in that city. The principal companies were represented by their presidents, who testified as to the details of their practice. According to the report each one of these presidents stated, among other things, that he had not seen the recommendations made by the Railroad Commissioners a year ago, looking to the promotion of safety on street car lines. Witnesses testified to timing street cars and it appeared that the speed was frequently as high as 18 miles an hour. It is said that 10 miles an hour is the legal limit throughout Brooklyn, and the officers of the roads testified that all their schedules were within the legal limit.

It is doubtless well that the Commissioners have held these public hearings, for the safe running of street cars concerns all the people living near the tracks, and the true nature of the problem ought to be made as plain as possible to everybody; but as far as learning anything new is concerned they might as well have stayed in Albany, for the suggestions issued by the Commissioners in their annual report a year ago (and summarized in the *Railroad Gazette*, page 38), cover the field, and the first question now to be asked is whether the Brooklyn companies have carried out those suggestions.

And the plain lesson of experience is that these suggestions are summed up in one paragraph (the ninth, on page xxvi. of the Commissioners' report) to wit, that first class, experienced men must be employed to run cars on much-traveled streets. Every street railroad superintendent knows that some few of his best motormen cause him no trouble, and that if he had the means and the opportunity to get that grade of men for all his cars the accident list would be reduced to the minimum. Any one who observes the general appearance of motormen will notice that on those lines where fewest accidents are

\* All cars should have four gates, only one of which should be open at a time, and open cars should have guards to make them equally safe. The Commissioners have made personal examinations of fenders and say that the best obtainable form should be adopted, as waiting for a perfect fender is unjustifiable. At the same time the cars should be operated so carefully that the fender will never come into use. The speed of cars should not exceed four miles an hour while crossing streets. At junctions the car not having right of way should come to a full stop before fouling the other track. Inspectors sufficient to attain and preserve the best discipline should be employed. Cars should not be allowed to meet on street crossings. At congested points watchmen should be employed. Speeds should be reduced on curves where the view is obstructed. The use of air-brakes like those on the cable roads in New York City should be considered. All applicants for positions as motormen should be subjected to a thorough examination; if satisfactory, they should then be trained in the shop or power house; then put on a car with an instructor, and finally, if appointed, should first serve on lines of least travel. These requirements properly interpreted, will necessitate the employment of first-class men. All cars on electric roads where the grade is over three per cent. should carry sand. Stops should be made only at crossings, except at designated stopping places where crossings are far apart. The propriety of stopping just before crossing a street, instead of just after, is discussed, but the Board is not yet ready to recommend such practice. The speed of street cars in suburban districts should not be over 12 miles an hour. In more populous localities the local authorities must regulate the speed. Professor Plympton, of Brooklyn, has said that nothing but a mechanical governor will probably limit the speed of electric cars, but the Commissioners evidently see the uselessness of this as a means of safety, and they recommend the use of an indicator in the car so that the motorman and the passengers can tell at a glance how fast they are traveling. The law should compel these street cars to stop before crossing steam railroads unless interlocking signals are provided. The law should also require signboards where electric lines cross highways in suburban districts.

reported the intelligence of the men is of a higher grade than on the others.

Moreover a moment's reflection shows that the need is for quick-witted motormen, old enough to keep their heads level, even if there were no experience to guide us. A single statutory speed limit is impracticable. A speed limit is more persistently recommended as a remedy than any other one thing, doubtless largely for the reason that socialistic notions have tainted so many minds with the idea that regulations and machinery can be used as satisfactory substitutes for men with intelligence and training. With rules enough and speed limits sufficiently complicated, it would be possible, theoretically, for a child to manage a car; but exactly as in handling a locomotive on a standard steam railroad, the conditions are so variable that the final reliance is the discretion of the runner.

A city street railroad needs at least three speed limits. In the most crowded places it must be very low. Even there a thick-headed motorman can waste the passengers' time by slackening speed too soon on approaching crossings. In medium conditions the speed can be higher, but still the average time between termini can be much shortened if the runner is alert and careful. In the thinly settled regions any limit low enough to be named in a law would be an injustice to the passengers and lessen the value of the road, for many streets in such districts are so free from wagons most of the time, and for long stretches, that the only necessary limit to the speed of a car is the danger of running off the track; and that will vary on different roads.

The principal object in using electric motors on street railroads is to get passengers over the ground faster than before, or as fast as is consistent with a reasonable expenditure for roadbed and track; and to do that with safety the custodian of the car must take advantage of every chance he can get to run much faster than would be allowable if carriages and wagons were occupying the street in front of or on either side of him. The limit of 12 miles an hour, mentioned by the Commissioners, is unnecessarily low where no team or pedestrian is in sight, and there is a long view ahead; if the track and car are good, probably 18 or 20 miles an hour is often practicable, and it is due to the passengers that they have the benefit of it. On the other hand, 12 miles an hour is too fast where a street is crowded, and the existence of a rule naming such a limit merely gives license to careless motormen.

Thus we see that a speed limit low enough to be of much use is impracticable. Of course some limit must and will be fixed; but it must be above the speed at which most of the accidents happen. And so we come back to the principles laid down by the Commissioners a year ago, of which the very foundation is the competent man in the right place. The duty of providing such men devolves upon the company in each case. A superintendent who is determined to have good men will readily get them if he has the money with which to pay them, while one who tries to get along with too low a grade of intelligence can pursue that policy with considerable impunity. A State Inspector, single handed, and without authority over the discipline will have hard work to prove just at what point the service is defective. But the Commissioners can at least make public all cases of inefficiency that they discover.

#### The Speed of The Locomotive.

In a recent issue of *The Engineer* Mr. Charles Rous-Marten writes a very interesting article under the title of "Eighty-Four Miles an Hour," in which he gives some of the results of his own observations on the speed of locomotives. He scorns the alleged records of the Americans, does not even mention the continent of Europe, and we do not discover that he accepts as authentic anything that he has not actually observed.

He speaks, for instance, of the apocryphal record of 112 miles an hour of engine No. 999 (New York Central), saying "that train was twice timed privately for me by two railway experts independently, both capable and trustworthy men, well versed in engineering matters and their results, obtained when the engine was presumably doing its best, fell short of these figures by about one-third." This sentence is followed by an exclamation point as a sort of concise statement of Mr. Rous-Marten's notion of the conclusiveness with which the observations of his two capable and trustworthy men did up the record of 999. But he goes on to tell us some of the sources of error in this kind of observation and how exceedingly difficult it is to get accuracy; and we suggest that he ought to tell how his observers timed the engine. He ought also to tell us what reason he has for thinking that the engine was "presumably doing its best" when these observations were made. We have never accepted this 112 mile-an-hour record, and Mr. Buchanan, the designer of 999, also never accepted it as a record. Unfortunately, some of the higher officers of the railroad permitted a placard to be displayed on that engine at the World's Fair, giving 112 miles an hour as its record for speed. This was a piece of advertising, and was unworthy of the railroad and of the splendid engine which it actually discredited. We have, however, accepted the figure of 102.7 miles an hour as being pretty well authenticated; although we admit that the observations were not taken with scientific care, and there may be an error of two or three miles an hour in the results deduced from them; but that the engine has really made over 100 miles an hour for a short distance seems highly probable.

Mr. Rous-Marten further says that "in another case a



very eminent American engineer absolutely vouched for the alleged fact that one of his engines had attained 82.5 miles an hour on a level road with a heavy train; but when he published his own recorded figures these showed the maximum speed to have been only 67 miles an hour, while in one instance his figures represented a train as passing a second station half-a-minute before the one previous."

Nine years ago Mr. Rous-Marten gave a good deal of attention to maximum speeds on the English railroads. He found speeds of 70 to 74 miles an hour often attained on falling grades, and 75 miles occasionally reached but very seldom exceeded. The highest speed that he noted in ordinary express train working was about 76.3 miles an hour. During the past eighteen months he has made a large number of observations on English railroads, and has taken the times either with three chronographs or with two chronographs and a watch. His plan was to use two chronographs for successive miles or quarter miles during the highest speed, using the third time piece as a check, taking the time for the longer distances; then, collating and comparing the records "which usually agree within one or two-tenths of a second." This method of timing has the appearance of scientific accuracy and apparently the observer has had practice enough to give him skill, and anybody who has ever tried to make fine time observations knows that skill in the use of instruments is as important as the instruments themselves.

In this later series of observations he first found a speed of 78.2 miles an hour with Webb's 3-cylinder compound engine "Greater Britain." This maximum was quickly passed by unquestionable instances of speeds of from 79.1 up to 79.5 on various trains, both up and down, on the Great Northern. These were single-driver engines, the driving wheels 8 ft. 1 in. and 7 ft. 7 in. in diameter. The loads ranged from 6 to 10 coaches (weights not given), the grades were falling, from 26.4 ft. per mile to 35.2. On the Midland, with 7 ft. 4 in. single-driver engines, like speeds were got with 12 coaches, on descending grades of about the same declivity, and on the North Eastern a compound, single-driver engine made this speed with 16 coaches down a grade of 52.8 ft. per mile.

His first clear case of 80 miles an hour was on the Great Northern with an 8 ft. single-driver engine, down a slope of 26.4 ft. per mile 5 miles long, and this high speed was got on the last mile of the incline, the two miles just preceding having been done at 76.5 and 78.2 miles an hour. This speed was promptly rivalled by a 7 ft. 7 in. single engine and by other 8 ft. engines on the lines of the same road.

This speed was shortly equalled on the London & North Western by two engines with 6 ft. 6 in. drivers with two pairs of drivers coupled. Here a train of 17 coaches was taken down the incline from Shap Summit to Carlisle, at 80 miles an hour for three miles. Then the Caledonian with 6 ft. 6 in. drivers, coupled, made 81.1 miles, also down grade.

Then the London & North Western made still better speed with two engines with 6 ft. 6 in. drivers coupled and trains of 16 coaches down the Shap grade, where the inclination is 70 ft. and 36 ft. per mile. Four successive miles were run in 56, 49, 45 and 44 seconds. Then again a mile was run in 44 seconds and this speed (81.8 miles an hour) is said to have been maintained for several miles down a grade of 1 in 125 (42.2 ft. per mile). Or, as Mr. Rous-Marten says, "fully 6 miles of the distance were run at a speed of 81.8 miles an hour by engines with 6 ft. 6 in. coupled wheels."

Then he got a large number of records of 81.8 miles, the Midland doing it with a 7 ft. 4 in. single-driver engine, on down grades ranging from one foot in 177 to one in 100. A 7 ft. coupled engine touched the same speed with nine coaches, down a grade of one in 200. Then the Great Northern got up to 81.8 miles with 8 ft. and 7 ft. 7 in. engines and trains of from eight to 10 cars, also on long down grades. Then the London & South Western with 6 ft. 7 in., coupled engines made two miles at this speed on a down grade of one in 80. Then the Caledonian got up to this limit and stuck there as also did Mr. Aspinall with a Lancashire & Yorkshire 7 ft. 3 in. coupled engine.

The first instance of a speed higher than a mile in 44 seconds for which Mr. Rous-Marten "can absolutely vouch" occurred unexpectedly and perhaps unconsciously to the driver. A Midland train north-bound was being hauled by two 7 ft. 6 in. single-driver engines, one of them a pilot engine going home. They were hindered by a strong side wind and other causes and on a 15-mile down grade set in to make up time. Then they ran up to 81.8 miles an hour as timed by two chronographs; but the speed kept on rising until it reached 83.7 miles an hour which was maintained for two miles, that is, two successive miles were run each in 43 seconds; 9½ miles were run in 7 minutes 13.4 seconds. Two doubtful quarter miles were timed in 10.7 seconds each, but from difficulty of observation these times are not quite certain and therefore are rejected. So Mr. Rous-Marten says "the fact remains that a speed of 83.7 miles an hour was unquestionably and indisputably maintained for two successive miles on a falling gradient of one in 200."—26.4 ft. per mile.

In the same week on the same railroad with an engine of the same class a Glasgow express with nine coaches ran 12 miles in 9 minutes and 14 seconds, including one reduction of speed, and on this run several successive quarter miles were run in 10.7 seconds each, equal to 84.1 miles an hour.

The Midland having got up to this speed, of course it was expected that the Great Northern engines would do as

well, and sure enough an inside-cylinder engine, 7 ft. 7 in. driving wheels, single, with a load of seven coaches, weighing approximately 100 tons, ran up to 10.7 seconds, for several successive quarter miles and two consecutive miles were run in 42.8 seconds; that is, 84.1 miles an hour. As we understand the statement this was on a down grade of one in 150 and one in 200. The engines which made this speed of 84.1 miles an hour had the following dimensions:

	Cylinders.	Drivers.	Mean pressure.
Midland.....	18½x26	7ft-6in	160lbs.
Gt. Northern.....	18½x26	7ft-7in	160lbs.

All the engines which exceeded the maximum recorded nine years ago have steam pressures from 150 to 175 pounds as against 140 in the earlier records. Cylinder diameters were larger in some cases, but not in all, or even in the majority of instances.

And now let us see some of the records of fast time made in the United States which Mr. Rous-Marten declines to accept. Two men, said by him to be competent, took the time of engine No. 999 when the engine was presumably doing its best. What justified this presumption he does not say. The first famous record of that engine was made May 9, 1893, hauling 362,000 lbs. of cars and passengers, the engine and tender weighing 204,000 lbs., the total weight of train being 283 short tons. This train ran on that trip 69 miles in 68 minutes, and during this part of the run made five miles in 3½ minutes or at the rate of 85.7 miles an hour, on a descending grade of about 20 ft. per mile. Here it will be seen was a chance for considerable error of observation without bringing the record down to the best English record yet obtained; and it will be seen also that the record is for five miles, which of course diminishes the chance of error somewhat. During the same run one mile was made in 35 seconds, or at the rate of 102.8 miles an hour. The speed was taken between mile posts, with a stop watch, by the conductor of the train. Mr. William Buchanan, the designer of the engine, who is certainly not a careless man in such matters, accepted this record as accurate. But if there had been an error of a whole second, which might easily have happened, the rate would still have been 100 miles an hour. We have, therefore, considered it safe to say that this engine has undoubtedly made as fast time as 100 miles an hour for one mile. It would have required an error of five seconds in timing this mile to bring the record down to 90 miles an hour, and an error of eight seconds to bring it down to Mr. Rous-Marten's best. It seems to us exceedingly improbable that so great an error could have been made. Concerning the record of upwards of 112 miles an hour we have always had doubts, and yet we have little doubt that that run was made at even a higher speed than the record which we do accept.

May 19, 1893, engine No. 903 of the New York Central, with the same train as was hauled by No. 999, is said to have made five miles on the same ground, that is, on a descending grade of about 20 ft. to the mile, in three minutes, or at the rate of 100 miles an hour.

Before this time there were five records running from 87.8 miles an hour up to 97.3, on the Philadelphia & Reading and the Central of New Jersey, made in 1890, 1891 and 1892. Three of these records, including the highest one, were made by engine No. 385, a Baldwin 4-cylinder compound. There is a circumstantial record of over 85 miles an hour made July 17, 1893, by compound locomotive 680 with a 5-car train. A distance of 13.5 miles was run in 9½ minutes, or at 85.25 miles an hour. The grade is broken, but is descending nearly the whole distance, varying from six feet to 37 feet per mile, with a very short bit of rising grade near the end. The times were taken to the nearest half minute, and they are, therefore, subject to considerable correction, which might easily reduce the average speed to 80 miles. So we do not attach great value to this as an instance of over 84 miles an hour.

There can, however, be no doubt that speeds of over 84 miles an hour are often made by the Philadelphia & Reading and Central New Jersey engines. A practical designer and builder of locomotives, in large practice, and with a good deal of experience in timing locomotives, says that "between Jersey City and Philadelphia it is a very common occurrence for the engines hauling the Blue Line trains to reach 90 miles an hour, the seconds per mile ranging from 38 to 45. It has been my pleasure to time these engines repeatedly at a rate of 40 seconds a mile, and I have taken indicator diagrams from them at a speed of 92 miles per hour." We shall hope to give in a later issue some detailed records that will carry on their face evidence of probable accuracy.

#### Continuous Brakes in England.

The Board of Trade blue book, giving statistics of the use of various forms of continuous brakes in passenger service on the railroads of the United Kingdom for the half year ending with June 30, has recently reached us. It appears that there are 42,836 carriages and other passenger train vehicles fitted with the automatic vacuum brake and 19,597 with the Westinghouse automatic brake; that is, 99 per cent. of the total passenger stock has one or the other. The automatic vacuum appears to be gaining slowly on the Westinghouse, for in 1892 the Westinghouse brake was used on a little more than one-half of the total passenger stock.

A very elaborate table is given of the cases in which continuous brakes have failed to act or have caused delay. In past years we have analyzed this table to show which brake gave the better result, and have uniformly

found that the Westinghouse showed fewer failures than the automatic vacuum, except in the one particular of the bursting of the flexible hose coupling. Inasmuch as there is no possible competition in this country between these two types of brake we shall not undertake the labor of analyzing this table again, although we should suppose that it would be a matter of a good deal of interest for the railroad men of England.

An appendix gives the usual circumstantial statement from the London, Brighton & South Coast, using the Westinghouse, of cases in which accidents have been prevented by the brake. The most startling of these is one in which five or six boys were discovered lying on the ground with their heads on the rail. The engineman sounded his whistle, but the boys did not move. Therefore, he shut off steam and applied the brake and was enabled to stop the train about an engine's length from the boys, whereupon they got up and ran away. It is a pity that they were not caught and flogged. This shows that even the small Briton can be as mischievous and silly as the small Yankee.

The rules and regulations relating to continuous brakes as issued by many of the companies are printed in the appendix. One feature of these is the persistence with which the notion that power brakes are only for emergencies sticks in the minds of railroad men in Great Britain. On the Cambrian, for example, the vacuum brake is not to be used at terminal stations, at junctions or at any station where another train may be standing on the same track, except in emergencies; that is, unless the driver is satisfied that there is an obstruction on the line which he could not stop short of by the use of the hand brakes. On the Great Northern, terminal stations must be approached cautiously, and guards must apply their hand brakes if there is any reason to suppose the engineman has not the train well in hand. Guards must have their hands on the hand brake when passing the distant signal of a terminal station and must so remain until the train is stopped at the station. On the Great Western the driver must test the continuous brake before passing distant signals, approaching terminal stations or stations where other trains may be standing on the same line, and must reduce the speed of the train by air, but he must always enter such stations at such a speed that the train may be stopped by the hand brake only. Station masters must see that all trains on commencing their journey are provided with sufficient hand brake power. On the London & North Western guards must in all cases use hand brakes to assist in stopping trains on approaching terminal stations and certain other principal stations. On the London, Brighton & South Coast trains must be under control approaching terminal stations or junctions, so that they can be stopped with hand brakes if necessary. On the London, Chatham & Dover the speed must be so regulated in entering terminal stations that the hand brake on the engine or tender will be sufficient to stop the train. On the Manchester, Sheffield & Lincolnshire guards must have their hands on the hand brakes when passing the distant signal of a terminal station, and must so remain until the train is stopped, prepared to use the hand brakes if it appears that the engineman has not the train under control. A similar regulation is in use on the Metropolitan (under ground). On the North Eastern speed at principal stations or junctions must be so regulated that the hand brake on the engine or tender will be sufficient to stop the train. On the South Eastern ordinary stops at the terminal stations must be made by the hand alone, and the power brake must be used only when the driver sees that the hand brakes will be insufficient to stop the train at the proper place.

The uniform recommendation of the Government Inspectors, whenever they have occasion to speak upon the subject, is to always use hand brakes at terminals. The last rule mentioned above, that of the South Eastern, conforms to this. The different phraseology of the other rules indicates the varying degrees of earnestness with which the different managers endeavor to comply with the inspectors' recommendations. Some of them, it is clear, take the view generally prevalent in America, that a power brake can be, and actually is, made so nearly infallible that the regulation requiring the regular use of hand brakes is not worth the loss of time that would be involved in using it and the trouble it would take to enforce it. If we may judge by results this view is a sound one. We do not recall an accident in this country in recent years, where the English rule would have saved lives or even much property, while on the other hand it would have caused many million minutes' delay.

#### Proposed Railroad Legislation.

The Legislature of South Carolina, which has just adjourned, passed a bill prohibiting the consolidation of competing railroads, the law to go into effect on March 1 next. It contains the usual provision against leases, mergers, etc. The Georgia Legislature has passed a law prohibiting the running of freight trains on Sunday except to carry perishable freight. These are the only laws actually passed which we have noted in the newspapers during the past week. The number of proposed laws is quite numerous, however, the several legislative mills having begun to grind at a lively rate. The grist is of the usual kind. We should be glad to classify these numerous bills according to their subjects, but to do this intelligently it would be necessary to wait a month or two; by that time we could tell how many and what States had "struck" the railroads for reduced passenger fares, how many for



increased taxation, and so on; but to best keep track of this news week by week we will pursue our usual plan of mentioning the States in alphabetical order.

The Legislature of Colorado has instructed its Senators at Washington, and requested the representatives of the State there, to urge Congress to appoint a single "independent" receiver for the Union and Central Pacific Railroads. This resolution is preceded by eight whereases, telling what a heap of deviltry the managers of the Pacific roads have committed during the past 25 years. The same body has before it, though it has not passed, a resolution, appointing a committee of inquisition to find out all about the railroads of the State, how much they cost, what they are earning, etc. The items named in the resolution are similar to those of the Texas law which requires the Railroad Commissioners to ascertain the cost of every railroad, etc. The Indiana Legislature has before it a sweeping measure to prohibit the acceptance or use of railroad passes by State officers under penalty of a heavy fine and forfeiture of office. The report before us says that the bill will have a rough road, as nearly every member has a pass. Senator Shearer, of Kansas, has presented a bill to increase the duties of the Board of Railroad Commissioners and to change the name of that body. Representative Gardenhire has presented a bill providing that any county, State or district officer who receives an annual pass from any railroad company, shall register it with the Secretary of State, who shall keep a public record of such passes. If any officer accepts a pass and does not have it registered, he shall be punished by fine or imprisonment, or both. Conductors are required to take up passes not bearing the certificate of the Secretary of State and a failure to do so subjects them to fine and imprisonment.

In Illinois a bill has been introduced providing for a State Board of Arbitration. In Minnesota there is a proposition to tax the equipment of sleeping car companies and telegraph lines. In Missouri Mr. Phipps, of Kansas City, proposes that the rate for sleeping car berths be limited to \$1 a night. Mr. Fitzgerald, of New York, has presented a bill authorizing cities to contract for transportation of policemen and firemen. In the Pennsylvania Legislature there is a bill to prohibit the consolidation of competing pipe lines, another to prevent the formation of trusts, and one to prevent the use of railroad tracks as public highways.

The new administrative division of the Prussian State Railroads, by which the 17,705 miles of the State system will be divided into 20 "directions," instead of 11, as heretofore, has been completed. Each direction may be compared with the management of a separate railroad in this country. The "operating bureaus," which more nearly correspond with a "division" of one of our railroads with which we can compare them, will be abolished in the new administration. Under each direction will be a number of "inspectors of operation," "locomotive inspectors," and "traffic inspectors," which may roughly be compared with our division superintendents, master mechanics and division or district freight and passenger agents. The number of miles worked by each directorate, and the number of subordinate offices taking orders from it are to be as follows:

Directorate.	Miles.	Operation.	Locomotives.	Traffic.
Altoona . . . . .	1,042	12	5	4
Berlin . . . . .	366	9	3	4
Breslau . . . . .	1,161	15	5	6
Bromberg . . . . .	1,053	12	4	4
Cassel . . . . .	903	12	4	4
Dantzic . . . . .	896	10	3	4
Elberfeld . . . . .	666	11	4	4
Erfurt . . . . .	799	9	2	3
Essen . . . . .	509	10	4	4
Frankfort-on-Maine . . . . .	798	11	3	4
Halle . . . . .	1,218	15	4	5
Hanover . . . . .	1,172	15	5	5
Kattowitz . . . . .	805	10	3	4
Cologne . . . . .	796	11	4	4
Konigsberg . . . . .	1,102	12	3	5
Magdeburg . . . . .	1,048	14	4	5
Munster . . . . .	781	11	3	4
Posen . . . . .	917	10	3	3
St. Johann-Saarbrücken . . . . .	568	8	2	2
Stettin . . . . .	1,110	12	4	4

This gives an average of 885 miles of railroad for each directorate, 77 miles to an inspector of operation, 246 to a master mechanic, and 216 to a traffic inspector. There will be one telegraph inspector (superintendent) to each directorate. The inspectors take the place of the 75 "operating bureaus" now existing; but they have no independent authority as the latter have, but will carry out the orders of the directorates. The new administration will not go into operation until April next; but the inspectors are already appointed, that they may become familiar with their duties beforehand. The small mileage of the Berlin directorate consists of the termini of all lines entering that city, so far as suburban trains run.

For the year 1893, 85 railroads in the German Railroad Union report axle breakages; having had altogether 1,180,741 axles in use, 78 per cent. of which were steel. On the lines of 32 of these railroads (presumably those with fewest breakages) 151 axles broke. Of these, 31 were locomotive axles, and 53 tender axles, so that only 67 were car axles. Of the broken axles, 24 were crucible steel, 27 Martin steel, 21 Bessemer steel, and 3 puddled steel. The average life of the broken crucible steel axles had been 18 years, of the Martin steel 6 years, of the Bessemer steel 16 years, of the puddled steel 24 years, of the iron axles 24 years. The average mileage of the axles previous to the fracture was 254,000 miles for the locomotive axles, 215,000 for the tender axles, and 182,600 miles for the car axles. The average distance run since he last inspection was 19,000 miles for locomotion, 16,000

for tender, and 9,000 for car axles. Fifty-five breakages were discovered while running between stations, 72 while passing stations, 15 during inspections, and 9 after collisions or derailments. Fifty were in passenger trains, 4 in mixed trains, 72 in freight, and 2 in work trains. As to the position of the fractures, 68 were in journals, 37 in the wheel seat, 29 close to the wheel seat, 16 in the shaft, and 1 in the crank of a driving axle. Other 21 railroads reporting (presumably those with most breakages) had 94 axles break (and 1,298 the year before). Of these 633 were iron axles, 102 Bessemer steel, 29 crucible steel, 11 Martin steel and 10 puddled steel. About 1 out of every 700 locomotive axles broke, 1 tender axle out of 862, 1 car axle out of 1,700. In 539 out of 794 cases the fracture was in the journal, and 210 in the wheel seat.

A writer in the Austrian *Railroad Journal*, in an article urging the need of more and more thorough criticisms of railroad books, says that nowadays something like 30 new railroad books, or considerable pamphlets, are published in the German language every year. Most of these books, he says, have been written by railroad men who have sacrificed their leisure for a long time, often for years, for the purpose, with no hope of pecuniary profit. Besides the valuable books by men really experts in their several branches of service, there is every year a number of poor ones by conceited incompetents, or by men who write to make their names known. This makes it extremely difficult for railroad employees, anxious to keep themselves informed about their business, to know what it is really worth their while to read. They cannot read all that appears, for lack of time, and much of it is not worth reading; yet, in the absence of capable criticisms of such works, they cannot easily learn what is really good.

A recent issue of the *Irrigation Age*, a journal published at Los Angeles, Cal., contains some entertaining correspondence. It appears that a Mr. Young wrote an article for that paper under the title of "The Mighty Colorado and Its Irrigation Possibilities," which article contained some statements remarkable enough to stir up Mr. Robert B. Stanton who happens to know something about the Colorado, as well as the country in question, and Mr. Stanton replies to Mr. Young at some length, in the issue before us. Mr. Young says that there are millions of acres awaiting irrigation and suggests that where this land is shut in by high ground tunnels and syphons could be used, which is a simple suggestion to make. He proposes that a dam should be built somewhere along the course of the Colorado and its waters diverted into Death Valley, filling that valley and reclaiming the surrounding desert. A map given by Mr. Young locates definitely the position for the dam, and the course of the canal and the country to be irrigated. An examination of the contour maps of the United States Geological Survey discloses some interesting facts. It shows that the proposed canal would be 150 miles long, and that, as high land with several mountain ranges lies between the Colorado River and Death Valley, the canal may be made with only one through cut. This, however, would be 150 miles long and have a maximum depth of 2,500 feet. Mr. Young suggests, however, that a tunnel might be used which would be only 125 miles long. To get the water from Death Valley to the various tracts to be irrigated would require only two more open cuts, one of 50 miles and another of 150. Mr. Stanton suggests that it would be folly to stop there, but the canal should go straight on through the Sierra Nevadas and turn the surplus water into the San Joaquin Valley which would take only one more tunnel, about 125 miles long.

A press dispatch from St. Joseph, Mo., says that the stockholders of the St. Joseph, St. Louis & Santa Fe, in electing directors for the ensuing year dropped from the Board seven wholesale merchants of that city because their passes, secured by their position as directors, operated as a discrimination in freight rates against other shippers. The change was effected by reducing the number of directors from 13 to five. This road belongs to the Atchison and the new directors are: Edward King, of New York; Aldace F. Walker, Chicago; and R. M. Bachellor, J. W. Starr and O. E. Rumer, of St. Joseph. Mr. Bachellor is the commercial agent of the road; Mr. Starr, superintendent of the Terminal Company, and Mr. Rumer is legal adviser. Mr. Walker evidently intends to manage the Atchison on business principles.

The acquisition of the new bridge at Louisville by the Cleveland, Cincinnati, Chicago & St. Louis and the Chesapeake & Ohio roads was noticed on page 894 of the *Railroad Gazette* for Dec. 28. President Ingalls has now called a special meeting of the stockholders of the last named road for Feb. 25, to ratify the action of the directors, and to join the Big Four in guaranteeing \$5,000,000 of 4 per cent. bonds of the bridge company. By securing control of this property, which includes franchises for important freight terminals in Louisville and track connections with the other roads, the Chesapeake & Ohio will place itself in a greatly improved position to secure business to and from the Southwest, and the Big Four will likewise improve its facilities for getting business for its Chicago line to and from the Southern States. The latter road will probably secure the right to run its trains into Louisville from the North over the branch of the Baltimore & Ohio Southwestern from North Vernon, 48 miles from Louisville. From Lexington, Ky., westward to Louisville, about 90 miles, the Chesapeake & Ohio, which now does business chiefly over the Louis-

ville & Nashville, will have an alternative line by building a few miles of track, the Louisville Southern being practically parallel to the Louisville & Nashville. It is said that not over four-fifths of the authorized amount of bonds will be issued at present, and the guarantee is to be borne two-thirds by the Big Four and one-third by the Chesapeake & Ohio. The bridge is about finished, but the tracks, freight yards and freight houses in Louisville are yet to be built, and it will be several months before business can be begun. The completion of this bridge, which was begun more than five years ago, and has been the scene of two disastrous accidents, makes three crossings of the Ohio River at Louisville. The trains of the Pennsylvania lines run over the Louisville Bridge Company's bridge (the oldest one), and those of the Baltimore & Ohio Southwestern over the Kentucky & Indiana Bridge.

The Senate Committee having in charge the pooling bill, recently passed by the House, has further postponed final discussion upon it, and it will not be reported to the Senate before Jan. 22.

#### Wire for the Hudson River Bridge.

Mr. Theodore Cooper, has sent out the following to all wire manufacturers in the United States and Europe:

Having been engaged by the New York and New Jersey Bridge Co. to prepare specifications for the construction of the proposed bridge over the Hudson River at N. Y. I desire to get certain information in reference to the wire to be used for the cables.

Amount of wire needed, 40,000 tons; strength desired, not less than 180,000 lbs. per square inch; size desired No. 3, or as near thereto as can be had.

The wire must have reasonable degree of toughness. As I desire to so formulate the specifications that reputable wire manufacturers can confidently name a price to the general contractors for furnishing this wire under a suitable guaranty, I would request such information as you can give me, bearing on the above.

What is the largest wire with the above minimum strength that could be obtained upon an order of 40,000 tons, within the next five years, and how would the probable price compare with that of wires of large wire gages?

Could wire of higher ultimate strength and relative toughness be had at a price not greatly disproportionate to its strength?

What length of wire, without welds, could be had of any gage?

Could the wire suggested by you be electrically welded without injuring the strength?

What would be considered a strict but possible limitation upon the variation of size to be permitted in such an order?

A reply to the above inquiries and any information bearing upon this subject will be appreciated.

#### TECHNICAL.

##### Manufacturing and Business.

Engel & Co. of 143 Liberty street, New York city, are introducing the corrugated sheet steel roofing formerly sold by the Non-Condensing Corrugated Roofing Co. The material consists of a fireproof lining of asbestos, secured to steel sheets by a special process.

The cars recently ordered by the Merchants' Despatch Transportation Company, 300 altogether, being divided equally between the Michigan Peninsular Car Co. and the Union Car Company of Depew, N. Y., are to be supplied with the insulating paper manufactured by the Standard Paint Co. of New York. The amount of material ordered is 414,600 sq. ft. of 2½ ply Giant P. & B. paper.

W. H. Miller, formerly Master Mechanic of the Columbus, Hocking Valley & Toledo, and later Superintendent of Motive Power of the Chicago & Eastern Illinois, is to be manager of a company which proposes to establish a plant at Columbus, O., for the purchase, sale and repair of railway equipments. Site options have been secured, but land purchases have not been made.

The Wellman Iron & Steel Company's mill at Chester, Pa., was sold last week by the receiver for \$600,000, which is \$17,000 above the bonded indebtedness. The purchasers were J. Tatnall Lea, President of the First National Bank of Philadelphia; Wm. Burnham, of the Baldwin Locomotive Works, and Wm. C. Neilson, a former manager of the Wellman mills, who represent a syndicate of creditors. The company is to be reorganized, and it is hoped to get the mills running in the course of two months.

The Foster Engineering Co. of Newark, N. J., report a rapidly increasing demand for their new "Class W" steam pressure regulators. Among orders just booked for large valves they mention one 10-inch for the Lehigh Valley R. R. Co. coal mines; three 8 inch and one 5-inch for the Watts Campbell Co., for use at the Newark electric light and power station; one 6-inch for the U Street pumping station, Washington, D. C., one 5-inch for Dixon's paper mills, and two 6-inch and two 4-inch for the new American liner "St. Louis." These latter are in addition to twenty regulators from 8-inch to 4-inch furnished for that ship in December.

The Garlock Packing Co. of Palmyra, N. Y., has recently established a New England branch with offices and salerooms at No 12 Pearl street, Boston, Mass. Mr. John D. Lane, for many years traveling salesman of the company, has been appointed General Manager of the New England



branch. The aim of this company is to make a superior packing for the plungers and pistons of pumps, pumping and hydraulic machinery. This packing is the outcome of numerous experiments and practical tests in the water ends of pumps, plungers, pump pistons, hydraulic elevators and hydraulic machinery, and it is claimed to be a first-class waterproof packing for light or heavy duty, made of the best flax and thoroughly lubricated with a waterproof compound, which is strictly free from acid.

#### Iron and Steel.

The reorganization of the Woodstock Iron Co., of Anniston, Ala., into the Woodstock Iron Works has been accomplished, and William G. Ledbetter was elected President, Hoffman Atkinson Secretary and James W. McCulloch Treasurer. First mortgage bonds for \$25,000 will be issued at once and complete repairs made to the blast furnace.

The works now being built by the Johnson Steel Co., at Lorain, O., will, it is stated, be six large blast furnaces, a converting department capable of converting the product of the six furnaces, and a rolling mill plant of about double the capacity of the present plant at Johnstown, Pa. The chief product of the rolling mills will be girder rails for street car lines, though by a modification of the plant it may be turned to the manufacture of T-rails for steam railroads without great expense. The company will also manufacture material for car springs, truck bearings and other parts of traction cars made of steel, including thin plates for roofing, vestibules and the like.

The Union Steel Company of Alexandria, Ind., has been organized and secured a charter in Indiana to operate the De Pauw Steel Works at Alexandria. The company also controls steel works at St. Louis and the two plants will be consolidated at Alexandria. A portion of the plant and machinery of the old De Pauw Company is still at New Albany, and will be removed to Alexandria as originally intended when the building of the new plant at the latter town was undertaken.

The receivers of the Reading Rolling Mill Co. and Cofrode & Saylor, incorporated, of Pottstown, Pa., which had both been operated under one management for some time previous to the failure of the companies, have given notice to the creditors that they propose to make application to the proper court, shortly, for an order dissolving the receiverships, and that they expect to transfer the business of the two corporations to the stockholders possibly by February 1.

#### New Stations and Shops.

The Pennsylvania Railroad is to erect a two-story iron repair shop, 40 x 60 ft. in Wilmington, Del.

Plans have been prepared by the Missouri, Kansas & Texas for a new passenger station at Sedalia, Mo. The building will cost about \$30,000.

It is reported on good authority that the Kanawha & Michigan Railroad will in the spring remove its car shops from Corning, Ohio, and Charleston, W. Va., to Point Pleasant, W. Va. Point Pleasant is now the midway point between Columbus, Ohio, and the end of the line at Gauley, W. Va., and it is to be made a division headquarters.

#### The Blackwell's Island Bridge.

The Pencoyd Iron Works (A. & P. Roberts & Co.) of Philadelphia, has received a contract to furnish between 35,000 and 40,000 tons of metal for the superstructure of this bridge, some account of which was given in these columns, Dec. 14, 1894. Work is to be begun in eight months and the bridge is to be completed within three years. Among the other bidders for the contract was a combination of the Carnegie Steel Co., the Union Bridge Co. and the Edgmore Bridge Co.

#### Oil Fuel for Locomotives.

The Southern California Railway, which is the western end of the Atebison, is now using oil on the locomotive of a regular passenger train, the experiments in freight service which have been going on for some time having proved highly satisfactory. The passenger engine equipped for oil is No. 652. General Manager K. H. Wade sends us a Los Angeles paper with a brief account of what he is doing. The apparatus has been put on under the supervision of William Booth, formerly Master Mechanic of the Peruvian Central Railroad. The oil tank on the tender holds five tons of oil and it is surrounded on three sides and on top by a water tank. The oil tank is provided with a gas vent and has two safety valves which are calculated to shut automatically in case the tender is upset or disturbed by a collision. There are two burners and atomizers. Mr. Booth received a patent on his invention dated Dec. 22, 1894. There is a good local supply of oil, and it has been used for fuel in Los Angeles for some years.

#### THE SCRAP HEAP.

##### Notes.

Two masked men robbed the express car in a Burlington train at Ottumwa, Ia., the other night by jumping into the car as it started away from the station before the safe had been locked.

A fire, destroying \$50,000 worth of buildings, cars, etc., occurred in the yard of the Long Island Railroad at Long Island City on the night of Jan. 11. It started in a mail car. On Jan. 13 a locomotive, six cars and several freight sheds and ferryhouses were burned at South Jacksonville, Fla.

The Union Pacific, which has lately discharged a large number of men at the Cheyenne shops, has reduced the

despatching force at Laramie and closed some small stations. The Canadian Pacific has suspended 500 men at Montreal, including 50 clerks. The shops of the Baltimore & Ohio at Connellsville, Pa., have been closed for 18 days.

The coal mine operators and miners at Fairmont, W. Va., have donated 20 cars of coal to the people of Northwestern Nebraska who are suffering for lack of food and fuel in consequence of the failure of crops the past season. The Baltimore & Ohio carries the coal free to Chicago. Many carloads of food have been sent to Nebraska as a free gift from various cities in the South. The Burlington road has carried 65 carloads of charity supplies to the destitute people of Nebraska during the last three months.

The Supreme Court of Indiana has affirmed the judgment of the Cass County Circuit Court in the case of Walcott against the Pennsylvania Company. Walcott charged that the company had ignored demands for cars to carry grain to Eastern markets and when cars were eventually furnished an excessive rate was charged. A verdict was rendered in favor of the plaintiff for \$12,532, with interest from April 1, 1891. The opinion was written by Judge Howard. He says it is clear that the company discriminated against the plaintiff, and the jury did right in awarding damages to cover overcharges.

A man arrested for drunkenness at St. Joseph, Mo., last week was found to have in his pockets a large number of counterfeit tickets purporting to have been issued by the "Georgia, Midland & Atlantic" railroad. Tickets of this kind have been sold by a broker at Hot Springs, Ark. Bogus tickets have also been taken up, purporting to have been issued by the "Great Falls & Northwestern" and other mythical roads. It is said that 55 lbs. of paper were used for tickets of this kind in a St. Joseph printing office. Two brokers of that city have been arrested and confessed. A number of plugged tickets have been presented, on the West Shore, by passengers coming from the West. A broker of Youngstown, O., has been arrested on the charge of altering a mileage book of the Erie.

Some robbers unsuccessfully attacked a train of the Southern Railway at Indianola, Miss., on the night of Jan. 11; they fired on the train and wounded two men.

Washington despatches report that the post office appropriation bill has been passed by the House without any provision for fast mail trains to Texas. It appears that some of the members from Texas as well as from Minnesota, Iowa and elsewhere are opposed to any action by the post office favoring the quick transmission of newspapers from the large cities to the smaller places in their States. A complaint has been received from Omaha that the fast mail trains leaving Chicago about 3 o'clock in the morning deliver the Chicago papers in Omaha and vicinity so early as to seriously injure the sale of local papers. In objecting to these appropriations for fast mails these members demand that provision be made for equally fast mails out of their States.

#### Eastern Bar Iron Manufacturers Organize.

Eighteen manufacturers of bar iron in the territory east of the Allegheny mountains met Jan. 3, in Philadelphia, and formed the Eastern Bar Iron Manufacturers' Association by the election of A. R. Whitney of the Portage Iron Co., of Duaneville, Pa., President; W. R. Gaubert, of Gaubert, McFadden, & Caskey, Philadelphia, and James Lord, of the Pennsylvania Bolt & Nut Works, of Lebanon, Pa., Vice Presidents; Howard T. Wallace, Secretary of the Diamond State Iron Co., of Wilmington, Del., Treasurer, and J. S. Elverson of the Catsaquia Mfg. Co., Secretary. It was resolved to adhere to the list of extras of the Eastern bar manufacturers which has been in vogue for several years, and further that "half of this list of extras for sizes and cutting to length should be the minimum charge."

#### Street Car Strike in Brooklyn.

All of the electric street cars in Brooklyn, N. Y., with the exception of one line, were tied up by a strike early on the morning of Jan. 14. The roads involved are the Brooklyn Heights, with 245 miles of single track; Brooklyn City & Newtown, 30.3 miles single track, and the Atlantic avenue, 42.5 miles single track. The road not affected is the Coney Island & Brooklyn, controlling 24.88 miles of single track.

The strike was precipitated by the refusal of the various companies to grant the demand of the conductors and motormen for either an increase in pay or shorter hours.

The men claim that runs exceed the legal limit of hours per day, and require speeds faster than the city regulations allow. The regular motormen and conductors were receiving \$2 a day for ten hours of actual service, and "trippers," working morning and evening, \$1.50. The men demand an increase of 25 cents a day, or a reduction in time.

The stoppage has thrown a tremendous traffic upon the elevated roads, and they have handled it with fair success. The receipts of both the Kings County and Brooklyn elevated lines were at once more than doubled. Thousands of people have had to walk to the bridge and ferries in order to reach their places of business in New York. It is estimated that the Brooklyn City Railroad lost in the first two days of the strike, \$33,000 in fares; the Brooklyn City & Newtown, \$3,300, and the Atlantic avenue \$5,000, and the employees about \$20,000 in wages.

At the present writing (Wednesday) the mail cars and some others are running, but the companies evidently are not quite ready to bring the issue to a head by putting on all the new men they can get. The number of strikers is said to have been about 6,000. There was some obstruction of tracks and petty violence of other kinds.

#### Sixty Persons Killed by an Explosion.

In a fire in the yard of the Montana Central Railroad at Butte, Mont., on the night of January 15, several cars of powder took fire and exploded with terrible force, killing a large number of firemen and bystanders. There were three separate explosions and hundreds of windows were broken, some of them as far away as two miles. As we go to press the number of fatal injuries is estimated at 60.

#### CAR BUILDING.

The Southern Railway is asking bids on 500 box cars. The Wisconsin Central is building 50 platform cars at its own shops to fill vacant numbers.

The Indiana Car & Foundry Co., Indianapolis, Ind., has just received an order to build 500 stock cars. The company is busy on repair work and manufacturing car wheels for railroads in its immediate vicinity.

The Cleveland, Cincinnati, Chicago & St. Louis contemplates ordering in the near future 500 box, 500 platform and 300 coal cars, and will soon be in the market for some locomotives.

#### BRIDGE BUILDING.

**Aspinwall, Pa.**—The Aspinwall Bridge Co. has been incorporated at Harrisburg to build a bridge over the Allegheny River from the foot of Centre avenue, Aspinwall, to the Butler street extension in Highland Park, Pittsburg. The directors are: Henry Warner, President; A. P. Kirtland, and E. K. Morse, all of Pittsburg.

**Confluence, Pa.**—The County Commissioners of Fayette and Somerset Counties met here Jan. 10, and decided to build a new bridge over the Youghiogheny River at this place. The citizens in the vicinity of Confluence will present petitions to the courts of both counties and endeavor to have them voted on by the March Grand Jury. If this can be done the bridge will likely be built next summer.

**Denver, Col.**—The following bills have been introduced in the Colorado Legislature: For a bridge across White River; to build a bridge across Snake River; for a bridge across the Blue, near Breckenridge; to build a bridge across Grand River, appropriating \$6,000.

**Galveston, Tex.**—The House of Representatives has passed the bill to-day granting the right to the Houston, La Porte & Northern Railroad Company to bridge Galveston Bay, Buffalo Bayou and Clear Creek, in Texas.

**Philadelphia.**—In regard to the objection made by the Philadelphia Trades League in reference to the construction of the bridge across the Delaware River by the Pennsylvania Railroad Company an officer of the company is quoted as follows:

"We were given authority by Congress to build a bridge across the Delaware River with spans of 300 ft., except the channel span, which was to be 500 ft., and a draw span of clear waterway of 125 ft. on each side of the pier. The bridge was to have a clear head room of forty feet from high tide. The company approved this plan, but voluntarily recalled it, and instead of having the spans only 300 ft. it made three spans of 540 ft. each, and a draw span of 150 ft. with a clearance of 50 ft. instead of 40 ft. This plan was approved by the Secretary of War and work has been begun in the building of the bridge."

**Toledo, O.**—Last week the Committee on Harbor, Commerce and Bridges rejected all bids for the erection of the Perry street bridge. The plans call for a lift bridge, to be operated by a 25 horse-power motor. The committee adopted a resolution instructing the city clerk to advertise for bids for constructing the proposed steel or iron bridge and trestlework over the Maumee from Fassett street to Walbridge.

Bids for the new Perry street bridge were opened at the city clerk's office last week, as follows: Wisconsin Bridge & Iron Works, \$31,070; Variety Iron Works, \$31,027; Toledo Bridge Co., plan No. 1, \$29,500; plan No. 2, \$36,750; plan No. 3, \$35,375; plan No. 4, \$37,000; Massillon Bridge Co., \$29,750; Milwaukee Bridge & Iron Works, \$37,200; Ohio Bridge Co., swing bridge, \$30,270; lift bridge, \$35,950.

**Youngstown, O.**—The Youngstown Bridge Co. was awarded the contract for the Madison Avenue Bridge at Indianapolis, Ind., consisting of one span of 83 ft. girders. This company also has the contract for a 4,000 ft. double track ocean pier for the Padre Island Harbor Co., Corpus Christi, Texas.

#### RAILROAD LAW—NOTES OF DECISIONS.

##### Powers, Liabilities and Regulation of Railroads.

A New York statute provides that no preference in the transaction of the business of a common carrier on its cars, or in its depots or buildings, or on its grounds, shall be granted by any railroad corporation to any one of two or more persons, associations, or corporations competing in the same business, or in the business of transporting property for themselves or others. The Supreme Court rules that the purpose of the statute is to prevent discrimination between rival shippers or rival connecting roads, and does not forbid a railroad company to grant to a hackman the exclusive privilege of coming into defendant's depot yards with his hacks.<sup>1</sup>

In Tennessee a railroad construction company organized a railroad company; controlled its stockholders; had its officers elected officers thereof; took its stock and bonds, raising therefrom the railroad company's only assets, which it also expended; made a contract for construction, specifying only that the road should be of a certain width, and providing a certain compensation, which was thereafter increased. The railroad company had no books for three years after its organization, and performed no corporate acts except to make contracts with the construction company. The Supreme Court rules that, as far as creditors were concerned, the two companies were one, so that a person who contracted with the construction company to do work on the road was entitled to a lien as an original contractor with the railroad company.<sup>2</sup>

In Iowa it is held that the statute declaring that any railroad company which shall bring any cattle into the State which, at the time they were brought, were in such condition as to communicate Texas fever, shall be guilty of a misdemeanor, and that any person who shall be injured may recover his damages, does not make the civil liability to persons injured by the importation of infected cattle absolute, but makes the injury only a prima facie case of liability, which may be rebutted by showing freedom from negligence on the part of the railroad company.<sup>3</sup>

In Texas the Supreme Court rules that since Act March 10, 1891, defining fellow servants, applies to all the railroads in the State, it does not deny to any of them the equal protection of the laws.<sup>4</sup>

The Supreme Court of the United States decides that the Connecticut law authorizing the railroad commissioners to order any railroad company, if in their opinion its financial condition will warrant, to remove a dangerous grade crossing, and allowing the entire expense to be imposed, in particular instances, on the railroad company, does not deny to it the equal protection of the laws, since the statute is applicable to all railroad corporations alike.<sup>5</sup>

##### Injuries to Passengers, Employees and Strangers.

The Supreme Court of Michigan rules that to shunt cars without an attendant thereon in a railroad yard is not



negligence per se, where the employees are aware of the custom and the danger therefrom.<sup>1</sup>

In Texas the Supreme Court rules that the fact that a boarding-house keeper who is injured by the unsafe condition of a depot platform, while meeting an incoming train to secure a boarder, was present at the depot by invitation of the telegraph operator employed by the railroad company, does not render the company liable, in the absence of any showing that the operator was acting within the scope of his employment in extending such invitation.<sup>2</sup>

In Kentucky it is held that where a brakeman, in removing a trespasser, kicks him from the train while in rapid motion, the railroad company is liable for injuries caused thereby, the act being within the scope of the brakeman's employment.<sup>3</sup>

In Virginia it is held that conductors of freight trains, who are required by the rules of the company to inspect all cars which they pick up in transit, cannot maintain actions for injuries caused by their failure to do so.<sup>4</sup>

In Michigan the Supreme Court rules that the ejection of a passenger is within the line of a conductor's authority, and, if performed by him wrongfully, recklessly, and oppressively, is ground for the recovery of exemplary damages from the company.<sup>5</sup>

The Supreme Court of New York rules that a railroad is negligent in substituting for a switch engine in one of its yards, during the night time, an ordinary freight engine, having none of the bumpers or appliances usual on switch engines to protect the switchman if he fails to make a coupling.<sup>6</sup>

The Federal Court holds that the acceptance of a mileage ticket which provides that "the purchaser agrees to sign his name in presence of conductor each time before detachment is made," and that, "unless the proper signature is given, this ticket is forfeited," does not constitute an agreement that the conductor may decide for the holder, as well as for the company, whether the holder is the purchaser named in the ticket.<sup>7</sup>

In Texas the evidence showed that plaintiff was standing on the rear of the tender of an engine which was backing on to a side track to connect with a car; that as the tender approached the car, with plaintiff ready to make the coupling, the two draw heads missed, and passed each other, plaintiff being caught between the car and the tender. The evidence showed that the failure of the drawheads to meet was caused by the sinking of the track. The Supreme Court holds that plaintiff could recover, it being the duty of defendant to inspect its track, and keep it in a reasonably safe condition, which duty plaintiff had a right to presume had been performed.<sup>8</sup>

In Iowa the Supreme Court holds that a rule of a railroad prohibiting the uncoupling of cars by going between them while in motion will be held to have been waived by the company where it was the custom of the employees to uncouple cars while in motion, and the practice was open and notorious, and had existed for such a time that its officers were chargeable with notice.<sup>9</sup>

In Indiana it is held that where a brakeman is killed by the use by defendant company of a defective coupling pin, defendant is liable, though the negligence of a fellow servant, whose duty it was to inspect the pin, may have contributed thereto.<sup>10</sup>

In California it is ruled that the fact that an engineer once ran his train in 40 minutes over a distance scheduled for an hour, though he knew that hand cars and section men might be on the track up to 10 minutes before schedule time, no accident having in fact occurred, does not show that he was unfit for his position, and that the company ought to have discharged him after notice.<sup>11</sup>

The Supreme Court of Iowa rules that a strong and well-built show car, placed nearest the engine, is not such a place of known danger as will render a passenger on the train, employed by a theatrical company to look after its show property, guilty of contributory negligence, as matter of law, in riding on the car in the performance of his duty; and in an action for his death, caused by collision with another train, a finding by the jury that he was not guilty of contributory negligence in so riding will not be disturbed.<sup>12</sup>

The Supreme Court of Alabama rules that a trespasser on a railroad train is entitled to recover for a wanton, willful, or intentional wrong committed by a brakeman within the scope of his employment, and to have exemplary damages included in the verdict.<sup>13</sup>

In Texas the plaintiff's son, a minor, was employed by defendant railroad company, with plaintiff's consent. While on a train with a message, at the request of the defendant's yard foreman, he attempted to uncouple a car, and was injured. He was under no obligation to obey the foreman. The Supreme Court rules that he was a mere volunteer, and could not recover.<sup>14</sup>

The Supreme Court of Georgia holds that a rule, prohibiting brakemen "from coupling or uncoupling cars except with a stick," and declaring that "brakemen or others must not go between the cars under any circumstances for the purpose of coupling or uncoupling, or adjusting pins, etc., when an engine is attached to such cars or train," does not apply to a case in which the entire was not attached to any car or train, and in which the brakeman stationed himself, in the way usually practiced by employees, upon the footboard of the pilot on the tender, and while there attempted to withdraw with his hand, without using a stick, a pin and link from the coupling apparatus of the engine, the engine and tender moving backwards at the time towards a standing car in the rear, for the purpose of being coupled thereto.<sup>15</sup>

In Virginia it is held that railroad companies have a right to presume that cars delivered to them by connecting lines are in proper condition.<sup>16</sup>

In Michigan the Supreme Court rules that when a railroad company has employed a competent inspector to inspect all cars received by it, and sees that they are properly loaded and in good condition, it cannot be held liable to a brakeman who, in coupling such a car to another, is caught by lumber loaded so as to project over the end of the car.<sup>17</sup>

## MEETINGS AND ANNOUNCEMENTS.

### Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

*Boston & Maine*, quarterly, \$1.50 per share, on the common stock, payable Feb. 15.  
*Huntingdon and Broad Top Mountain*, semi-annual, 3½ per cent. on the preferred stock, payable Jan. 31.  
*Long Island*, quarterly, 1 per cent., payable Feb. 1.  
*Toledo & Ohio Central*, quarterly, 1½ per cent. on the preferred stock, payable Jan. 25.

### Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

*Fort Wayne & Jackson*, annual, Jackson, Mich., Jan. 25.  
*Granite*, annual, Boston, Mass., Jan. 21.  
*Missouri, Kansas & Texas*, special, Parsons, Kansas, Feb. 14, to ratify the lease of the Southwestern Mineral.  
*Pittsburg, McKeesport & Youghiogheny*, annual, Pittsburg, Pa., Jan. 22.

### Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Freight Claim Association* will hold its annual meeting in Chicago on March 13. The headquarters will be at the Auditorium. The Secretary is S. A. Mehoffer of Philadelphia.

The *New York Railroad Club* meets at the rooms of the American Society of Mechanical Engineers, 12 West Thirty-first street, New York City, on the third Thursday in each month, at 8 p. m.

The *New England Railroad Club* meets at Wesleyan Hall, Bromfield street, Boston, Mass., on the second Wednesday of each month.

The *Central Railway Club* meets at the Hotel Iroquois, Buffalo, N. Y., on the fourth Wednesday of January, March, April, September and October, at 10 a. m.

The *Southern and Southwestern Railway Club* meets at the Kimball House, Atlanta, Ga., on the third Thursday in January, April, August and November.

The *Northwestern Railway Club* meets at the Ryan Hotel, St. Paul, on the second Tuesday of each month, at 8 p. m.

The *Northwestern Track and Bridge Association* meets at the St. Paul Union Station, on the Friday following the second Wednesday of March, June, September and December, at 2.30 p. m.

The *American Society of Civil Engineers* meets at the House of the Society, 127 East Twenty-third street, New York, on the first and third Wednesdays in each month, at 8 p. m.

The *Western Society of Engineers* meets on the first Wednesday in each month, at 8 p. m. The headquarters of the society are at 51 Lakeside Building, Chicago.

The *Engineers' Club of Philadelphia* meets at the House of the Club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month, at 8 p. m.

The *Engineers' and Architects' Club of Louisville* meets in the Norton Building, Fourth avenue and Jefferson street, on the second Thursday in each month, at 8 p. m.

The *Association of Engineers of Virginia* holds informal meetings on the third Wednesday of each month, from September to May, inclusive, at 710 Terry Building, Roanoke, at 8 p. m.

The *Boston Society of Civil Engineers* meets at Wesleyan Hall, 36 Bromfield street, Boston, on the third Wednesday in each month, at 7.30 p. m.

The *Engineers' Club of St. Louis* meets in the Missouri Historical Society Building, corner Sixteenth street and Lucas place, St. Louis, on the first and third Wednesdays in each month.

The *Engineering Association of the South* meets on the second Thursday in each month, at 8 p. m. The Association headquarters are at The Cumberland Publishing House, Nashville, Tenn.

### Association of Engineering Societies.

The Association of Engineers of Virginia and the Denver Society of Civil Engineers have become members of the Association of Engineering Societies. The Association now embraces ten societies, being the Boston Society of Civil Engineers, the Western Society of Engineers, the Civil Engineers' Club of Cleveland, the Engineers' Club of Kansas City, the Engineers' Club of Minneapolis, the Montana Society of Civil Engineers, Engineers' Club of St. Louis, the Civil Engineers' Society of St. Paul, and the two which have just joined.

### Canadian Society of Civil Engineers.

A meeting was held last week at Montreal at which W. H. Perley read a paper on "Resistance of Piles," and Mr. Hodge a paper on "Inland Navigation."

### Connecticut Association of Civil Engineers.

The annual meeting of the *Connecticut Association of Civil Engineers* was held at Hartford, Conn., a week ago. Following is a list of papers that were read at the meeting:

A Report of the Special Committee on Field Work, on a Question Submitted to that Committee, to be read by F. W. LaForge, Waterbury; the annual address of the retiring president, E. P. Augur, Middletown; "Electric Railways," William G. Smith, Waterbury; "The Filtration of Water for Domestic Uses," Joseph B. Ryder, New York City; "Sewage Disposal Works at New Rochelle, N. Y.," J. K. Wilkes, New Rochelle, N. Y.; "Notes on Heavy Pipe Laying," R. A. Cairns, Waterbury; "Cast Iron Piles as Supports for Heavy Superstructures in Special Cases," D. E. Bradley, East Berlin; "The Water Works of Norwich, Conn.," Charles E. Chandler, Norwich.

### Engineers' Club of Cincinnati.

The annual meeting of the club was held on December 20. There were 26 members present. One new member was elected and three applications for membership received. The report of the Secretary for the past year showed a net increase of nine members during the year, making the membership 124.

There were 16 new members elected, six resignations, and one death during the year. Regular meetings were held each month, except July and August, and papers were read at all these meetings.

The election of officers for the coming year resulted as follows:

*President*, M. D. Burke; *Vice President*, C. A. Ewing; *Directors*, L. C. Frith, C. E. Lindsay and C. H. Meeds; *Secretary and Treasurer*, J. P. Wilson.

The retiring President read a paper on Engineering Practice.

### Western Railway Club.

The January meeting of the Western Railway Club was held on the 15th at 2 P. M., in the Auditorium Hotel, Chicago. The discussion was based upon Mr. Wm. Forsyth's paper on locomotive fuel read at the December meeting. It will be remembered that Mr. Forsyth con-

finned himself to a treatment of the heat values of Western coals. At the January meeting some of the practical features of fuel using were presented by Mr. S. P. Bush, Superintendent Motive Power of the Pennsylvania lines west of Pittsburgh, Southwest system, in a paper entitled "Methods of Obtaining Economy in the Use of Fuel for Locomotives."

A paper was also presented by Mr. F. A. Delano, Superintendent of Freight Terminals of the C. B. & Q. R. R., entitled "Notes on English Railway Practice." This paper is very thorough and comprehensive. It takes up in sequence the following topics, The right of way and structures, The track and road bed, The locomotive department, Passenger service, Freight service, Station service, Signaling, Organization, Savings, Superannuation, Insurance and pension funds, Recruiting the service, The Board of Trade and Parliament, The Clearing House, and Grade Crossings.

### The Engineers' Club.

The annual meeting of this flourishing institution was held last Tuesday night at the house of the club, 10 West Twenty-ninth street, New York. The report of the Board of Management shows a total membership of 673, the resident members being 359. The cash balance is \$15,048 and the available net balance \$17,478. The net assets \$22,478. The membership increased but slightly in the year; but a decrease had been feared because of the hard times. The surplus of receipts over expenditures was \$3,516. The management of the club is vested in Trustees, one-fourth of whom retire every year. Those elected to serve until 1899 were A. C. Rand, A. G. Mills, H. G. Morse, W. H. Fletcher and E. H. Wells.

The Board elected the following officers: President, John Stanton; First Vice-President, Chas. H. Loring; Second Vice-President, H. G. Prout; Treasurer, A. C. Rand; Secretary, G. W. Bramwell. The club serves a very useful purpose as a center for engineers and men of like interests; and is much more used by non-resident members than are most social clubs.

### Southern and Southwestern Railway Club.

The Southern & Southwestern Railway Club if it may be judged by its proceedings, except in the matter of paper and printing, which are bad, is advancing rapidly to the front and at the present rate of progress will soon show to some of the other railroad clubs what such associations are organized for. The November Proceedings are an example of what can be done by a proper selection of subjects and men to handle them.

The report of the committee on "Hand Holds and Safety Appliances for Protection of Train Men," was summarized in our issue of Dec. 28. The report of the committee on "What are the Best Agents and Best Appliances for Removing and Preventing Scale in Locomotive Boilers," was also summarized in the same issue.

The committee on the "Best Form of Deflector Plates and Smoke Boxes to give Maximum Economy of Fuel," presented quite a long report with several illustrations. The substance of the report is as follows: It is absolutely necessary to have a draft appliance so arranged that it will be impossible to obtain more draft through the lower than the upper flues. The present form of single draft sheet for large boilers is defective in a marked degree for the reason that when the plate is adjusted to the point where the engine steams best, there will be found to be one of several undesirable conditions existing as follows:

First. The movable plate is set so high, in order to get sufficient draft through the top flues, that the bottom flues are sacrificed; in other words, become stopped up in a short time, on account of insufficient draft to keep them open; but the difference is made up by the advantage of increased area in heating surface in middle and upper flues, with the movable plate adjusted to height where the engine will steam best.

Second. By the loss of bottom flue area, there is an increased draft on the remaining flues, which will cause severe pulling on the fire, and unequal distribution of draft on grates, the draft being greater through the center and top flues, and in the center and rear of grate surface.

Third. With the flues stopped up in the bottom of the boiler, there is a corresponding lowering of temperature, which with the upper flues and flue sheet heated produces unequal expansion and contraction, thereby causing no end of trouble by flues leaking. The stopping up of lower flues can be prevented by lowering the movable plate; but, by so doing, we are confronted with a condition as bad as when the flues were stopped up; namely, the draft is reduced through the top and middle flues, and concentrated in a reduced number of bottom flues, thereby creating an excessive pull of fire in the front of the fire box, and burning an excessive amount of coal. All of these conditions suggest very clearly the absolute importance of a uniform draft through all of the flues, at one and the same time, and so maintained, without the continuous necessity of cleaning out, re-rolling and caulking boiler flues.

Your committee does not recommend a perforated sheet, for the reason that the openings are too nearly adjacent to the flues, and do not offer sufficient resistance to the gases, permitting too free access of same to the front end of stack, thereby causing excessive loss of heat.

The committee presented a double deflector plate design which they claim has given a saving of 20 to 25 per cent. in fuel, and conclude that "It will require time and a great deal of experimenting and study to demonstrate the proper design of draft sheet" and recommend that a series of experiments with a pyrometer be made, evidently with the purpose to measure the temperatures in front of the different rows of flues, but the value of such measurement is not given, and it is not clear just what they would show unless it is assumed that the stronger the draft through the different tubes, the greater will be the temperature opposite them. The pyrometer can scarcely be taken to be as good an indicator of the uniformity of the draft as is found in the relative amount of deposits in the tubes, and in the opinion of experienced firemen as to the uniformity of the action on the fire. It is hardly necessary to say that an engine must be in very bad condition when any possible change in the deflector plate will save 20 to 25 per cent. in fuel.

The important report of the committee on Counter-balancing Locomotives is given in the *Railroad Gazette*, January 11. It is the most instructive and practical paper on counter-balancing so far presented to the railroad clubs and presents facts showing that there are those who design and build locomotives who do not give sufficient attention to the probable effects on the track.

## PERSONAL.

—Mr. B. T. Wheeler, Assistant Chief Engineer of the New York, New Haven & Hartford Railroad, has been appointed Superintendent of Streets of Boston, by Mayor Curtis, of that city.

—Mr. James M. McDonald, Superintendent of the Phoenix Bridge Works, well known as a bridge builder and engineer, died at Phoenixville, Pa., on Jan. 10, of pneumonia, aged 44 years.

<sup>1</sup>Brown vs. N. V. C. & H. R., 27 N. Y. S. 69.

<sup>2</sup>McDonald vs. C. C. & C., 24 S. W. Rep., 252.

<sup>3</sup>Furley vs. C. M. & St. P., 57 N. W. Rep., 719.

<sup>4</sup>Campbell vs. Cook, 4 S. W. Rep., 977.

<sup>5</sup>N. Y. & N. E. vs. Bristol, 14 S. Ct. 437.

<sup>6</sup>Schaible vs. L. S. & M. S., 56 N. W. Rep., 565.

<sup>7</sup>Post vs. T. & P., 23 S. W. Rep., 708.

<sup>8</sup>Smith vs. L. & N., 23 S. W. Rep., 652.

<sup>9</sup>R. & D. vs. Dudley, 18 S. E. Rep., 274.

<sup>10</sup>Lucas vs. Michigan Central, 56 N. W. Rep., 1,039.

<sup>11</sup>Smith vs. B. R. & P., 25 N. Y. S., 638.

<sup>12</sup>P. C. C. & St. L. vs. Russ., 57 Fed. Rep., 822.

<sup>13</sup>T. S. V. & N. W. vs. Guy, 23 S. W. Rep., 633.

<sup>14</sup>Lowe vs. C. St. P. & M. & O., 56 N. W. Rep., 519.

<sup>15</sup>L. N. A. & C. vs. Berkeley, 35 N. E. Rep., 3.

<sup>16</sup>Holland vs. South Pac. R., 34 Pac. Rep., 666.

<sup>17</sup>Blake vs. B. C. R. & N., 56 N. W. Rep., 405.

<sup>18</sup>M. & O. vs. Seals, 13 South Rep., 917.

<sup>19</sup>T. & N. O. vs. Skinner, 24 South Rep., 1,001.

<sup>20</sup>R. & D. vs. Mitchell, 18 S. E. Rep., 290.

<sup>21</sup>R. & D. vs. Dudley, 18 S. E. Rep., 274.

<sup>22</sup>Dewey vs. D. G. H. & M., 56 N. W. Rep., 756.



—Commissioner W. B. Groseclose, of the Galveston Freight Bureau, has been appointed to the position of Assistant General Agent of the Missouri, Kansas & Texas, with headquarters at Houston, Tex.

—Mr. J. E. Phelan, recently chosen Secretary of the Board of Railroad Commissioners of North Dakota, is a railroad man, having been Division Superintendent and Master Mechanic on the Northern Pacific.

—Mr. E. E. Davis has been appointed Assistant Superintendent of Motive Power of the Philadelphia & Reading Railroad. Mr. Davis has for some time been connected with the Boies Steel Wheel Co., and was formerly with the Boston & Maine Railroad.

—Mr. D. D. Davis has been appointed Receiver of the Toledo, St. Louis & Kansas City Railroad, vice Mr. S. R. Callaway, who resigned to take the Presidency of the Nickel Plate road. The new Receiver of the road has been General Auditor and assistant to the Receiver.

—Mr. J. J. Farnsworth, traveling passenger agent of the Southern Railway Co., with headquarters at Birmingham, Ala., has been appointed Assistant General Passenger Agent of the Plant Steamship Company, with headquarters in Savannah, under Col. B. W. Wrenn, the Passenger Traffic Manager.

—At last week's meeting of the Carnegie Steel Co., Ltd., Mr. H. C. Frick was made Chairman of the Board of Managers, and Vice-Chairman John G. A. Leishman elevated to the Presidency. This change will relieve Mr. Frick of much detail work and give him more time for the broader questions of business policy and management.

—Mr. H. C. Pond, Superintendent of the Columbus, Sandusky & Hocking Valley, has resigned that position. He has held it since November, 1890, and for the year previous had been Superintendent of Transportation. He was for many years connected with the Columbus, Hocking Valley & Toledo road as agent, operator and trainmaster.

—Mr. John L. Merriam, one of the pioneers of Minnesota, died at St. Paul, Jan. 12, aged 70 years. Colonel Merriam was connected with many of Minnesota's largest enterprises. He was president of the Minnesota Stage Coach Co. before the days of railroads, and was President of the construction company that built the Northern Pacific Railroad from Duluth to Moorhead.

—Mr. Frank Hunter has been appointed Assistant Treasurer of the Pennsylvania road. Mr. Hunter has for some time past been acting as assistant to the treasurer. The appointment now gives the treasury department two assistant treasurers. Mr. Peabody has held the office of assistant for several years and will continue in the position. Mr. Hunter entered the service of the Pennsylvania Railroad as clerk in Auditor of Passenger Receipts Department. On April 1, 1893, he became assistant to the Treasurer.

—Mr. D. Miller, Chief Engineer of the Great Northern Railway, has resigned, and his successor is Mr. John F. Stevens, Assistant Chief Engineer. Mr. Miller has been with the road continuously since April, 1879, when he was employed as locating engineer. In July, 1880, he became Engineer of Bridges and Buildings in addition to locating engineer. In January, 1885, he became Chief Engineer of the Great Northern. Mr. Miller expects to take a long rest before again engaging in business. Mr. Stevens, the new Chief Engineer, was principal assistant engineer of constructions of the Pacific extension under Mr. E. H. Beckler, and later Assistant Chief Engineer under Mr. Miller for one year.

—Mr. S. R. Callaway has been elected President of the New York, Chicago & St. Louis Railroad Company. The election of Mr. D. W. Caldwell as President of the Lake Shore & Michigan Southern made necessary the election of a new President for the Nickel Plate, and Mr. Callaway was chosen for the position. He is now Receiver of the Toledo, St. Louis & Kansas City Railroad Company. He is a Canadian by birth, and entered railroad service in 1863 with the Grand Trunk. He left the Grand Trunk road in 1874 to become General Superintendent of the Detroit, Saginaw and Bay City, now a part of the Michigan Central. From 1881 to 1884 he was General Manager of the Chicago & Grand Trunk and President of the Chicago & Western Indiana. On Sept. 1, 1884, he was made Vice President and General Manager of the Union Pacific, and retained those positions until June 30, 1887. He has been the President of the Toledo, St. Louis & Kansas City since September, 1887, until very recently. He was appointed Receiver in 1889, being President of the road at that time.

—Among those honored in the New Year's day list was Mr. Charles Scott, General Manager of the London & Southwestern Railway, who was knighted. Mr. Scott, now Sir Charles Scott, is a figure of rather more than usual interest to our American readers inasmuch as it has been greatly due to his energy and discernment that the new life of the port of Southampton was begun, that the docks there were acquired by his company and that the American Line of steamers changed from Liverpool to Southampton. He is a singularly active and capable manager, is the actual working head of the great railroad which he directs, and is withal a man of admirable simplicity and geniality of nature. Another new knight is Mr. John Jackson, who was contractor for the foundations of the Tower Bridge and also for the last eight miles of the Manchester Ship Canal. He is now engaged in important dock works at various ports in Great Britain. Dr. W. H. White, C. B., chief contractor of the Navy, was created a knight commander of the Bath, a most honorable distinction, and a rare one for a civilian to have achieved.

#### ELECTIONS AND APPOINTMENTS.

—*Atchison, Topeka & Santa Fe.*—J. P. Hall, Colorado Passenger Agent, has been promoted to the position of General Passenger Agent for Colorado and Wyoming, as successor to General Agent Colbran. A. P. Tanner, transferred from Topeka to Denver, will be Assistant General Freight Agent.

—*Big Laurel & Panther Creek.*—At the first general meeting of the stockholders and incorporators of this road, held last week at Selinus Grove, Pa., the following directors were elected: George K. McGraw and Charles T. Davis, of Baltimore, Md.; T. E. Carson, of Virginia; John L. Miller, W. J. Gartner, Oden C. Gartner, and L. M. Boyer, of Pennsylvania. W. J. Gartner was elected President, John L. Miller, Vice-President, and J. M. Boyer Secretary. The proposed road is to connect with the West Virginia Central & Pittsburgh, and is to develop the natural resources of the Cherry River valley.

—*Boston & Maine.*—William H. Young has been appointed Auditor of Passenger Accounts, in place of George E. Sturtevant, who has been transferred to the Traffic Department.

—*Buffalo & Susquehanna.*—John D. Campbell, who has been assistant superintendent of the motive-power department of the New York Central, and had charge of

the equipping and opening of the locomotive shops at Depew, has been made Superintendent of Motive Power of this road in Northern Pennsylvania, with headquarters at Austin, Pa.

—*Carrabelle, Tallahassee & Georgia.*—H. P. Simmons has been appointed Assistant General Manager of all companies of the Clark Syndicate in Florida, the Georgia & Florida Investment Co., Carrabelle, Tallahassee & Georgia Railroad, Gulf terminal & Navigation Co., and Scottish Land & Improvement Co. He will retain the direct management of the Georgia & Florida Investment Co. J. A. McDuffe has been appointed Traffic Manager for the railroad and terminal companies. Abram Ball has been appointed Superintendent of the railroad and the Gulf Terminal & Navigation Co., with headquarters at Carrabelle, Fla. Frank P. Damon, Chief Engineer and roadmaster, has been appointed paymaster of the railroad.

—*Central Pennsylvania & Western.*—The directors of the company have elected R. T. McCabe, of New York, President. The Board has reorganized by electing the following directors: E. R. Payne, Williamsport; James Kerr, Clearfield, Pa.; Wilberforce Sully, New York; Morris Liveright, Steven Peabody, N. M. Betts, Towanda, Pa.

—*Central Traffic Association.*—C. H. McKnight has been chosen Freight Commissioner with office at Chicago. This is a new office. The duties of the Commissioner will be similar to those of the same officer in the Trunk Line Association. H. C. Smith will take the place of Mr. McKnight as Secretary of the Association.

—*Chicago & Carbonate.*—The incorporators and first Board of Directors of this Illinois corporation are: William L. Huse, St. Louis; John J. McLean, Hillsboro; John W. Griswold and James H. Atterbury, Litchfield; A. G. Brown, St. Elmo; W. S. Carter, St. Louis, and Rodney Kelly, St. Elmo, Ill., who are interested in the Chicago, Paducah & Memphis road.

—*Dallas Terminal Railway & Union Depot Co.*—The following officers were elected by the directors at Dallas, Tex., last week: President, W. C. Connor; Vice-President, E. M. Reardon; Secretary, W. S. Simpkins. Executive Committee—J. C. O'Connor, J. E. Schneider and A. Sanger.

—*Detroit & Mackinaw.*—The reorganized Detroit, Bay City & Alpena Railroad Company, now known under the above name, has elected C. H. Coster, of New York, President; J. D. Hawkes, of Detroit, Vice-President and General Manager, and G. M. Crocker, of Mount Clemens, Mich., Auditor and Purchasing Agent.

—*Eastern Minnesota.*—J. M. Guiber has been appointed Assistant Superintendent of the Eastern Minnesota at West Superior, Wis.

—*Fonda, Johnstown & Gloversville.*—The annual meeting of the company was held at Gloversville, N. Y., Jan. 8. The following were elected Directors: James Shanahan, James P. Argersinger, J. Ledlie Hees, George M. Place, H. Walter Webb, G. Levor, Z. B. Whitney, R. T. McKeever, John G. Ferris, James I. Younglove, J. S. Friedman, A. J. Zimmer, Thomas F. Kyne, and S. H. Shotwell. The officers elected were: President, James Shanahan; Vice-President, James P. Argersinger; Treasurer, J. Ledlie Hees; Secretary, George M. Place; General Superintendent, R. T. McKeever. The only change in the board is the election of H. Walter Webb, Third Vice-President of the New York Central, as a Director. Mr. Webb recently purchased the stock formerly owned by D. A. Wells, of Johnstown.

—*Fort Worth & Denver City.*—J. V. Goode has been appointed General Superintendent of the Fort Worth & Denver City Railroad.

—*Gulf & Interstate.*—The following directors of this company, the Populist project for a North and South railroad, elected the following directors at a recent meeting at Topeka, Kan.: President, P. J. Close, of Topeka; Vice-President, E. Stoddard, of Omaha; Secretary, D. I. Furbeck, of Topeka; Auditor, A. Wardall, of Topeka; Treasurer, Albert Griffin, of Topeka. The additional directors are J. H. Whetstone, of Ottawa, Kan.; Fox Winne, of Newton; L. P. Featherstone, of Forrest City, Ark.; "Buffalo" Jones, of Perry, O. T.; C. J. Rundell, of Wayne, Neb.; Noah Allen, of Topeka; G. H. Niblow, of Galveston, and A. S. Churchill, of Lincoln, Neb.

—*Georgetown & Granger.*—The following directors have been elected: D. H. Snyder, Lee M. Taylor, F. W. Carothers, E. Taylor and W. T. Jones, all of Georgetown, Tex., and R. Lyles, of Cameron, Tex.

—*Great Northern.*—John F. Stevens has been appointed Chief Engineer to succeed N. D. Miller, resigned. He will have also supervision of the company's Pacific Coast lines, the Montana Central and the Eastern of Minnesota.

—*Kings County Elevated.*—The following directors of the railroad company were elected in Brooklyn, N. Y., last week: Edward A. Abbott, August Belmont, James R. Carter, James H. Frothingham, James Jourdan, William A. Read, James O. Shelden, N. Newton Smith, and Henry J. Robinson.

—*Lancaster & Hamden.*—The annual election has resulted as follows: Directors, Philip Rising, J. G. Reeves, William B. McCracken, B. J. Dunn, J. H. Axline, J. A. Hawkes, A. Baum, Peter Miller, Henry E. Becker, A. Beach and Otis Ballard. The Board elected J. G. Reeves, President; William McCracken, Vice-President; Philip Rising, Treasurer; B. J. Dunn, Secretary.

—*Louisville, Evansville & St. Louis.*—Henry King has been appointed Superintendent of Terminals of the road at New Albany, Ind. Mr. King has been freight and ticket agent of the road at that point for a number of years.

—*Louisville & Nashville.*—Frank Browder has been appointed General Freight Agent of the road south of Decatur, Alabama. He succeeds to the position formerly occupied by Mr. Theodore Welch, who died suddenly last week. Mr. Browder was Mr. Welch's chief clerk.

—*Macon & Northern.*—The following are the present officers of this company, which has been recently reorganized: N. E. Harris, Vice-President, Macon, Ga.; E. T. Horn, General Manager; A. H. Porter, Superintendent and Chief Engineer; A. Shaw, Traffic Manager; R. E. Urquhart, Auditor; E. W. Burke, Treasurer, and R. A. Mills, Chief Dispatcher and Car Accountant.

—*Middletown & Cincinnati.*—The following are the present officers of this company recently reorganized: Paul J. Sorg, President, Middletown, O.; Frank H. Ray, Vice-President, Chicago; W. L. Dechant, Secretary; Thos. Hetzler, Treasurer, and J. C. Simpson, General Manager, of Middletown, O.

—*Missouri, Kansas & Texas.*—W. B. Groseclose, Commissioner of the Galveston Freight Bureau, has resigned, to become Assistant General Freight Agent of this road, with office at Houston, Tex.

—*Monterey & Mexican Gulf.*—Thomas Riley, formerly General Superintendent of the St. Louis, Kansas City & Colorado at St. Louis, has been appointed Superintendent of this road, with headquarters at Monterey, Mexico.

—*New York, Mobile & Mexican Steamship Co.*—A. C. Michaelis having resigned as Traffic Manager, General Agent C. B. Cleveland has been placed in temporary charge, with headquarters in St. Louis.

—*Northern Pacific.*—George H. Earl has been elected Secretary to the Receivers to succeed James B. Williams, resigned.

—*Pennsylvania.*—The company has transferred the headquarters of its southeastern passenger district from Lexington, Ky., to Atlanta, Ga., and has put G. R. Thompson in charge of the business of the division, which comprises the States of Virginia, North Carolina, South Carolina, Florida, Georgia, East Alabama, East Tennessee and Eastern Kentucky, with headquarters in Atlanta.

—*Philadelphia & Reading.*—E. B. Crossley has been appointed Assistant General Freight Agent, with headquarters in Chicago.

The old Reading management was re-elected at the meeting at Philadelphia on Jan. 14 without opposition, as follows: President, Joseph S. Harris; Managers, A. J. Antelo, James Boyd, Joseph P. Sinnott, Thomas McKean, John Lowber Welsh, and George F. Baer; Treasurer, William A. Church; Secretary, William R. Taylor.

—*San Antonio & Gulf Shore.*—The directors of the railroad now building out of San Antonio, Tex., have elected G. G. Clifford, President; ex-Governor John Ireland and Judge W. W. King, General Attorneys.

—*Savannah, Florida & Western.*—J. A. Larned has been appointed Assistant Superintendent of the Silver Springs, Ocala & Gulf, and that portion of the Savannah, Florida & Western, South Florida Division, between Lakeland and Santa Fe Junction, with headquarters at Ocala, Fla., vice Captain O. G. Finch, resigned.

—*Southern.*—The appointment of J. N. Ross as superintendent of the Sixth Division with headquarters in Birmingham, Ala., has been made permanent. When Superintendent Ryder, of the Georgia Pacific, was transferred from here to Columbia, S. C., last August, Mr. Ross, who held the office of trainmaster at that time, succeeded him, and when under the new reorganization of the company, Sept. 1, new divisions were formed, Mr. Ross was placed in charge of the Sixth Division, comprising the Alabama division of the old East Tennessee and the Georgia Pacific, from Birmingham to Greenville, as acting superintendent.

—*Union Pacific, Denver & Gulf.*—W. C. Sanders, trainmaster and roadmaster of the Cheyenne & Northern Railroad, the second division of this road, has been succeeded by J. A. Rasback, of Denver. Mr. Sanders has been filling the position ever since the road was separated from the Union Pacific.

—*Western New York & Pennsylvania.*—C. C. Leech has been made general foreman of the shops at Babcock street, Buffalo. He has been foreman of the Pittsburgh & Western shops at Foxburg, Pa.

The following directors were re-elected at the annual meeting in Philadelphia, this week: Samuel G. De Courcy, Nicholas Thouron, George E. Bartol, Charles M. Lea, J. Rundle Smith, William C. Bullitt, John K. Barclay, E. W. Clark, Jr., E. L. Owen, P. P. Pratt, Isaac N. Seligman, Rudolph Flinsch, and Frank G. Rogers.

—*Western Railroad Association.*—At the annual meeting of the Western Railroad Association, held at Chicago, Jan. 8, the following officers were elected: President, B. P. Ayres; Treasurer, A. G. Payson; Secretary, C. R. Babouff.

—*Wheeling & Lake Erie.*—The report printed two weeks ago of the appointment of Mr. T. Leonard as Car Service Superintendent of this road was erroneous.

#### RAILROAD CONSTRUCTION, Incorporations, Surveys, Etc.

—*Cambridge & London.*—A local organization has recently been effected at Cambridge, Wis., to complete a road between Cambridge to a connection with the Chicago & Northwestern at London, Wis. The distance is something over three miles and there is an existing grade in good condition which will require little work to prepare it for the rails beyond building a few culverts. The work will be completed in the spring and an extension of about half a mile will be built to reach Lake Ripley, which will bring the company an important traffic in carrying ice. No contracts have yet been let. H. A. Olsen of Cambridge, Wis., is Secretary.

—*Chicago, Iowa & Dakota.*—The surveyors began work last week on this new line out of Eldora, Ia. The company was organized at Alden last week. Judge John Porter, ex-President of the Chicago, Iowa & Dakota Railway is President, and F. B. Rogers, of Britt, Ia., is Vice-President. The survey will be from Alden, which is the terminus of the Chicago, Iowa & Dakota road, toward Sioux Falls, via Clarion.

—*Choctaw, Oklahoma & Gulf.*—Grading has been completed on the road from Oklahoma City east to Shawnee, 40 miles, and track-laying has begun. The work is being pushed as rapidly as possible.

—*Cleveland, Lorain & Wheeling.*—Work on the extension of the road to Cleveland is being pushed rapidly, and it is expected that the passenger trains will be running into Cleveland within a month. The Erie station and terminals will be used temporarily. The new extension is about 25 miles long.

This company is building a five mile extension of the Pigeon Run switch in the Massillon coal field district, Ohio.

—*Dallas Terminal.*—President W. C. Connor, of the Dallas Terminal Railway, says that the engineers will begin to run the preliminary lines for the terminal road in a few days.

—*Florence Southern.*—Articles of incorporation were filed with the Secretary of State at Denver, Col., last week for this company, with a capital stock of \$1,000,000. W. E. Johnson, James A. McCandless, W. K. Johnson, all of Florence; O. M. Ladd and J. B. Orman, of Pueblo; H. H. Tompkins, of Westcliff, and Hosea Townsend, of Silver Cliff, are the incorporators. The intention is to build a railroad from Florence to Silver Cliff through Oak Creek Canyon. Many of the incorporators are directors of the Florence, Cripple Creek & State Line road.

—*Missouri, Kansas & Texas.*—The company has issued a circular to stockholders stating that it is the policy of the company to construct at once two small branches, the first being a spur of 16 miles to the coal mines owned by it in southeastern Kansas, and the second filling a gap of about 35 miles, connecting the Kansas City and St. Louis divisions. The means for construction will be provided by sale of first mortgage extension five per cent gold bonds, to be created to an amount not exceeding \$20,000 a mile of new line and equipment. It is



designed to make this bond a uniform security to be available to build branches, should any be imperatively needed in the future, in the States of Missouri and Kansas, or in the Indian Territory. A stockholders' meeting has been called for Thursday, Feb. 14, to ratify the programme set forth in the circular.

**Monterey & Fresno.**—Grading was begun on this road at Monterey, Cal., last July, but up to the present time hardly ten miles of the line has been graded. The officers now state that the construction work will be pushed ahead with vigor early in the spring of this year. The route of the line has been already described, but it may be briefly stated that the road is projected from the town of Monterey, on Monterey Bay, Pacific Ocean, eastward to the San Joaquin Valley, passing through the following towns and cities in the order named, viz., Salinas, San Juan, Hollister, Tres Pinos, Firebaugh (head of navigation on San Joaquin River), Madera, to the city of Fresno, in the San Joaquin Valley. The whole length of the line between Monterey Bay and Fresno City is 171 miles. The region to be traversed by the road has been covered by comprehensive preliminary surveys and a great part of the line permanently located. The contracts for grading and track laying on the first division from Monterey to Hollister, 46 miles, was let to McLean & Early, of Seattle, Washington, in July, 1894, and the grading is now progressing, but no track has been laid as yet. The character of work on the whole line is not difficult—about 70 miles is on the San Joaquin plains, about 30 miles in the Coast Range and Gabilan Mountains, and the remainder of the route is over valley or gently undulating lands. There are a number of short tunnels to be constructed in the mountains, four iron or steel bridges to be built, one on the Salinas River, one on the San Benito River, and two on the San Joaquin River. The maximum grade is 79.2 ft. to the mile and the sharpest curvature is 10 degrees. The officers are: A. W. Jones, President; H. A. Greene, Vice-President; L. W. Moultrie, Secretary; T. C. White, Treasurer, and P. P. Dandridge, Chief Engineer and General Superintendent, all of Monterey, Cal.

**Napoleon, Deshler & Northwestern.**—This company was incorporated at Columbus, O., last week by M. Donnelly, Robert K. Scott, W. O. Hudson, James W. Hanna, D. Meekis, George Eggers, D. W. Humphrey and W. P. Tyler. The company will build and operate a railroad from Deshler, Henry County, to Montpelier, in Williams County. The capital is \$50,000.

**New Roads.**—Mr. J. W. Maxey of the firm of Maxey & Weed, of Austin, Tex., has just surveyed a road from a point on the Gulf, Colorado & Santa Fe seven miles southwest of Coleman City, Tex., to the Vining coal mines on the Colorado River. The profiles and estimates are now being prepared at the Austin office of Messrs. Maxey & Weed, and probably work will soon begin on construction. The object of the building of this road is to develop the rich coal fields in that section. The Vining mine is now in operation.

**Northern Neck.**—The Northern Neck Railroad & Transportation Co. was organized last week at Fredericksburg, Va., by the election of the following officers: W. C. Haight, of Bridgeport, Conn., President; F. L. Rodgers, of Bridgeport, Conn., Secretary and Treasurer; Directors, Hon. W. A. Little, Jr., and Hon. M. B. Rowe, of Fredericksburg, and George B. Jones, of Richmond, Va. Over \$100,000 of the capital stock was subscribed by Northern capitalists. The company proposes the construction of a railroad down the Northern Neck of Virginia, from Fredericksburg. It is announced that an arrangement has been entered into looking to the building of the road, the capital for that purpose being guaranteed.

**Rio Grande Northern.**—Kiel & Co., of San Antonio, Tex., have the contract for this new road in Texas, as already reported. The contract was awarded by the San Carlos Construction Co. The contractors are to commence work at once. The officers of the company are: President, Frederick Gwinner; Vice-President, S. A. Johnston; Treasurer, John P. Ober; Secretary, A. S. Straub, and General Manager, F. Gwinner, Jr., all of Pittsburg. This road is to be 26 miles in length, extending from Chispa on the Southern Pacific to the San Carlos coal field. G. H. Marshall, of El Paso, Texas, is Chief Engineer. The road has been contracted to be finished in six months, when the coal company will begin shipments at once.

**Rumford Falls & Rangeley Lakes.**—This company, as already reported, is building an extension of the Portland & Rumford Falls road, from Rumford, Me., its present terminus, north to the Rangeley Lakes. The road now under construction is from Rumford Falls to the mouth of Bemis Stream. The contract for grading and track-laying for the first 18 miles has been let to Ward Bros., the survey being completed no farther yet. The light work and most of the earth excavation has been completed, only the heavy rock cuts and deep earth cuts remaining to be done. The maximum grade is 2 1/2 per cent. There are two steel bridges, one across Swift River, 100 ft. span, and one across Androscoggin River at Rumford Falls, 350 ft. long in one span of 200 ft. and two of 75 ft. each. The road will be built by a stock subscription of \$90,000, and an issue of bonds to an amount not exceeding \$8,000 a mile of main line. The officers are: President, Galen C. Moses, Bath, Me.; treasurer, Fritz H. Switchell, Bath, Me., and constructing engineer, R. B. Starlton.

**San Pete Valley.**—Civil Engineer O. K. Young and a party of 16 surveyors, who have been making the preliminary survey of the extension of Salt Lake City, reached the latter town last week. They have been in the field about two months. The distance is about 111 miles from Moroni.

**Sierra Valley.**—The organization and incorporation of this company in California have been recently completed. The road will be located in the county of Washoe, Nevada, and the counties of Sierra, Lassen and Plumas, in the State of California. Commencing at Reno, Washoe County, Nev., it will extend in a northwesterly direction through Sierra and Lassen counties in California to the summit of Beckwith Pass; thence westerly to the town of Mohawk, and northwesterly to a point near the town of Quincy in the American Valley, Plumas County. The entire length of the railroad is to be 100 miles. The Directors are John M. Platt, James Elder, John Flittie, Fletcher F. Ryer and William S. Kittle.

**St. Louis, Perry & Chicago.**—This company was incorporated at Springfield, Ill., last week. It is proposed to build a road from Grafton, Jersey County, to Bushnell, McDonough County. The capital stock is placed at \$500,000, and general offices at East St. Louis. The incorporators and first Board of Directors are: James M. Piper, St. Louis; C. G. B. Drummond, St. Louis; J. A. Porter, St. Louis; F. L. Hall and G. W. Worthing, of Perry, Ill.; L. W. McMahon, Griggsville, Ill., and C. E. Bolton, Milton, Ill.

**Superior & Eastern.**—The officers of this railroad which was recently incorporated in Wisconsin, talk very confidently of beginning the construction work in a short

time. The directors include some officers of the State Government of Wisconsin, and Mr. John Hunner, State Treasurer and Treasurer of the railroad company, is one of the most active of the projectors of the new railroad. The charter of the company authorizes a line from Superior, Wis., to Sheboygan, Wis., on Lake Michigan. An existing road of about 30 miles will be purchased by the new company and the first work which it is proposed to undertake will be the construction of 50 miles, the survey of which was completed in 1893. The contract for this section is expected to be given out in February next. The sale of sufficient bonds to build this 50 miles has already been negotiated. F. Geale, of Sheboygan, Wis., is President, and the Secretary is J. D. Cameron, of 84 Adams street, Chicago, who has been interested in railroad work in the West for some time. G. W. Sturdevant, Chamber of Commerce Building, Chicago, is the Chief Engineer, and J. W. Fletcher is Locating Engineer.

**Toledo, Ann Arbor & North Michigan.**—Grading has been completed on the two and one half miles of new terminal lines at Toledo, and grading is in progress on the line from Temple to Clarence, Mich., three and one-half miles. The latter is a relocation, as is also the cut-off from Lake George, Mich., south one and one-half miles, upon which grading has been completed. Surveys are in progress for a 14-mile cut-off from Ann Arbor to Hamburg Junction, Mich., to eliminate bad curves and grades.

**Tunnelton, Kingwood & Fairchance.**—At a meeting of the stockholders of this company, held last week at Kingwood, W. Va., John G. Bishop, W. M. O. Dawson, William G. Brown, W. S. Worley and other stockholders disposed of their interests in the company to Mr. J. Ami Martin, George C. Sturgiss, and three others, whose names are not made public. George C. Sturgiss was elected President. J. Ami Martin Vice-President, Secretary and General Manager, and James W. Parker, Treasurer. They, with A. S. Vance and George A. Wallis, constitute the board of directors. Mr. Sturgiss announces that the road, which is now a narrow gage, ten miles long, extending from Tunnelton, on the Baltimore & Ohio, to Kingwood, Preston County, W. Va., will be made standard gage by April. He also says that the road is to be extended to Fairchance, Pa., and to Morgantown W. Va., a distance of 40 miles. It will take what is known as "Black Bottle" route, a route which has been locally famous for 30 years, passing through Reedsville, and Masontown, W. Va. The price paid for a controlling interest was \$30,000. The old stockholders, all local people, secured written guarantee that the extensions should be made before disposing of their stock. The road when extended will pass through several fine coal and iron ore fields, and will open large timber areas along the Cheat River.

**Union Pacific, Denver & Gulf.**—Receiver Trumbull has recently returned from a trip into Texas and New Mexico made to examine into the advantages to be secured for his road by an extension from Amarillo, Texas, to Roswell, N. M., the present terminus of the Pecos Valley railroad. The distance is about 200 miles and the grades easy. The road would open up a large cattle growing region and would afford the best outlet to the farming districts now being rapidly improved by the Pecos company. J. R. De Remer has been awarded a contract to grade a seven-mile extension from Forbes Junction above Trinidad, Col., to the rolling mills. This is an attempt toward closing the 80 mile gap between Trinidad and Pueblo. Receiver Trumbull is working upon the proposition and predicts that the line will be completed to Pueblo before next July. The road is still running its trains between Trinidad and Pueblo over the track of the Denver & Rio Grande with which it has a traffic contract, but a court order has permitted the Receiver to annul this and construct an independent line when possible. Whether the discussion of a separate line is for the purpose of securing a modification of the trackage contract with the Denver & Rio Grande, or a determination of the Receiver to strengthen his property, as announced, remains to be seen.

**Wichita Falls.**—The surveyors are still working on this railroad which is projected as a branch of the Missouri, Kansas & Texas in the northwest part of Texas near the Pan Handle section. A preliminary survey has been made and part of the line cross sectioned. The branch will leave the present line of the Missouri, Kansas & Texas at Henrietta extending northwest to Wichita Falls, a distance of 18 1/2 miles. The line will parallel the Fort Worth & Denver City line which now crosses the Missouri, Kansas & Texas at Henrietta. The contract has been let to J. A. Kemp of Wichita Falls and sublet to Burkett Brothers, the well known contractors of Tyler, Texas. The work has been started at Henrietta with about 100 teams. The grade is 52 ft. to the mile and the maximum curvature four per cent. The only bridge work is one iron bridge. The railroad commissioners of Texas have authorized the issue of \$250,000 of six per cent 30 year gold bonds to complete the construction work. Of these bonds the contractor takes \$130,000 and the balance has been sold by the company and will be sufficient to complete the road. It will be operated when finished as a branch of the Missouri, Kansas & Texas, a contract to that end having already been made.

## GENERAL RAILROAD NEWS.

**Asheville & Spartanburg.**—Judge Simonton of the United States Circuit Court in Charleston, S. C., has signed a decree for the sale of the Asheville & Spartanburg Railroad. The sale will take place at Spartanburg, on Feb. 15.

**Atchison, Topeka & Santa Fe.**—The statement of the company for November shows a gross decrease of \$197,114, but expenses were reduced \$168,679, leaving a net loss of \$28,436. Expenses were reduced \$55,628 on the St. Louis & San Francisco road, \$11,848 on the Atlantic & Pacific, and \$11,085 on the Colorado Midland, but were increased \$41,855 on the Atchison main line. The comparative statement for November and five months follows:

ATCHISON PROPER.				
November.	1894.	1893.	Inc. or dec.	
Gross earn. . . . .	\$2,989,744	\$3,079,058	D	\$89,314
Oper. expen. . . . .	1,948,590	1,906,735	D	41,855
Net earn. . . . .	\$1,041,154	\$1,172,323	D	\$131,169
Since July 1.				
Gross earn. . . . .	\$12,664,159	\$15,095,577	D	\$2,431,418
Oper. expen. . . . .	9,415,694	9,368,324	I	47,370
Net earn. . . . .	\$3,248,465	\$5,727,253	D	\$2,478,788
ST. LOUIS & SAN FRANCISCO.				
November.				
Gross earn. . . . .	\$566,444	\$569,495		\$3,051
Net earn. . . . .	\$262,424	\$209,847	D	\$52,577
Since July 1.				
Gross earn. . . . .	\$2,811,621	\$2,938,020	D	\$126,399
Net earn. . . . .	\$1,301,725	\$1,256,185	I	\$45,540

## WHOLE SYSTEM.

November.				
Gross earn. . . . .	\$4,001,699	\$4,198,813	D	\$197,114
Net earn. . . . .	\$1,405,188	\$1,433,623	D	\$28,436
Since July 1.				
Gross earn. . . . .	\$17,489,718	\$20,075,622	D	\$2,585,904
Net earn. . . . .	\$4,889,259	\$7,183,183	D	\$2,293,924

**Baltimore City Passenger.**—A reorganization of the company was effected at the annual meeting on Jan. 9. This step was made necessary by the death of Oden Bowie, formerly President of the company, and the retirement of two of the directors. The Board of Directors chosen was Gabriel D. Clark, Wesley A. Tucker, E. Austin Jenkins, Bernard Cahn, John W. Hall, Alexander Shaw and Walter S. Franklin. Colonel Walter S. Franklin was chosen President. Upwards of 78,000 shares out of a possible 100,000 were voted, being the largest number ever represented at any annual meeting in the history of the company. The system of street railroads under the control of this company consists of three cable routes and the same number of lines operated by trolley. It has 50 miles of track, 75 lb. girder rails, employs 300 cars and generates power in three cable power houses and one electric plant.

**Baltimore & Cumberland.**—Stockholders of the West Virginia Central, Pittsburg and Piedmont Cumberland Railroads have decided to indorse the bonds of the Baltimore & Cumberland for \$3,600,000. This line is to extend from Cumberland to Hagerstown, Md., about 80 miles, and is projected as the eastern outlet of the West Virginia Central & Pittsburg.

**Charleston, Sumter & Northern.**—Judge Simonton, in the United States District Court, in Charleston, S. C., has signed a decree ordering the sale on Feb. 15, of this Northern Railroad. The petition was filed on behalf of the Atlantic Coast Line and was not opposed.

**Columbus, Hocking Valley & Toledo.**—In the Common Pleas Court at Columbus, O., Judge Pugh has overruled the demurrer of the defendants in the suit of the Central Trust Co., of New York, against Judge Stevenson Burke and others. In 1881, while Burke was President of the Columbus, Hocking Valley & Toledo Road, the stockholders voted to issue \$8,000,000 of bonds for extending and double-tracking the road. Burke and the other defendants, it was claimed, sold the bonds and diverted the money to their own uses. The present suit is one of a series brought to recover this money. The petitioners ask for the \$8,000,000 and interest, which brings the entire sum to nearly \$14,000,000. To the petition Judge Burke filed a demurrer which raised all the vital points in the case. The Court held that the action was not barred by the statute of limitation and that the final result of the case depended upon whether the trust was a constructive trust. The Judge decided that it was an express trust, the beneficiaries' trust intent being to have the \$8,000,000 applied to uses to which it was consecrated by the resolves of the directors and stockholders and agreement of the deed. The demurrers having been overruled, the case will now be tried on its merits.

**Evansville & Richmond.**—Messrs. Harvey Fisk & Sons have issued a circular to the Evansville & Richmond bondholders, submitting a proposition from the Evansville & Terre Haute Railroad Company for the settlement of their claims against the latter company. It is proposed that bondholders surrender their bonds with all coupons attached and accept a non-cumulative and non-voting five per cent. preferred stock of the Evansville & Terre Haute at the rate of 85 per cent. for the par of their bonds and par for the interest accrued and unpaid to Jan. 1, 1895. The issue of preferred stock is limited to the amount required to take up \$1,400,000 Evansville & Richmond bonds outstanding. All expenses incurred in the litigation are to be paid by the Evansville & Terre Haute. These bonds were guaranteed by the Evansville & Terre Haute, the road being built as a branch of that line. About two years ago, the interest was defaulted, the new management of the road declining to recognize the validity of the guarantee. Since then the litigation has been before the courts. One decision has been secured by the bondholders against the Evansville & Terre Haute, which has been appealed by the railroad company. The compromise now arrived at will be followed, of course, by a dismissal of this appeal.

**Fitchburg.**—The Massachusetts Railroad Commissioners have approved the issue of \$1,359,000 bonds of the Fitchburg to take up the maturing debenture bonds of the Boston, Hoosac Tunnel & Western.

**Intercolonial.**—The total revenue from the Intercolonial Railroad, owned and operated by the Dominion Government, during the year ending June 30, 1894, was \$2,987,510, a decrease of \$77,988 as compared with the preceding year. The working expenses were \$2,981,671, a decrease of \$66,000; thus leaving a surplus of revenue over working expenses of \$5,838. The receipts from passenger traffic were for 1894, \$958,915, and for 1893, \$1,002,912; from freight traffic, for 1894, \$1,834,126, compared with \$1,868,823 for 1893. In the working of the Prince Edward Island Railway by the government there was a deficit of \$66,896.

**Lake Roland Elevated.**—The sale of the Lake Roland Elevated Railroad of Baltimore to the City & Suburban Railway Company was effected last week, and announced on Saturday morning. This property was thrown into the market through the embarrassment of the Jarvis-Conklin syndicate of New York. The purchase was absolute, the City & Suburban Company assuming the mortgage of \$1,000,000 against the property, and paying \$250,000 for the stock, the face value of the latter being also \$1,000,000. The Lake Roland Elevated Railroad was one of the five street railroads of Baltimore with 26 miles of track, comprising two lines, one running northward to Roland Park and Lakeside, and the other extending out North avenue westward to Walbrook. The two lines joined on North avenue and entered the city by way of North street, running in over an elevated structure 75 miles long. The City & Suburban Company lines now consist of 87 miles of track all operated by electricity, except the line running from the city limits on the Frederick road to Catonsville. The Lake Roland Elevated was built to give transportation facilities to the people of Roland Park, one of the real estate ventures of the Jarvis-Conklin syndicate. It went into operation in 1893.

**Louisville & Nashville.**—The report of earnings for the six months ending Dec. 31, is given below:

	1895.	1894.	Inc. or Dec.	
Gross earn. . . . .	\$10,195,475	\$9,755,923	I	\$439,553
Oper. expen. . . . .	6,094,224	5,881,346	I	212,878
Net earn. . . . .	\$4,101,251	\$3,874,577	I	\$226,674
Int. and taxes. . . . .	2,820,410	2,850,713	D	30,303
Balance . . . . .	\$1,280,841	\$1,023,864	I	\$256,977
Other income . . . . .	179,844	161,940	I	17,904
Total income . . . . .	\$1,460,685	\$1,185,804	I	\$274,881

From the total income this year the following deductions are made: Loss on Georgia Railroad, \$1,361, on other roads, \$40,106; sinking fund payments, \$283,000; construction account, \$28,855; unfunded discount, \$3,261, and



balances of advances to South & North Alabama Railroad brought forward from previous years, \$697,669, a total of \$1,054,352, leaving a surplus for six months of \$406,433, as against \$1,113,680 the previous year, when the only deduction from total income was \$72,124 on account of loss on roads operated.

**Midland Terminal.**—A trust deed was filed in the District Court at Colorado Springs last week from the Midland Terminal Railroad Company to the Farmers' Loan & Trust Company of New York for the sum of \$1,000,000. It is dated October 19, 1894, and covers all real and personal property.

**Philadelphia & Reading.**—Judge Dallas, of the United States Court at Philadelphia, has filed an opinion in the United States Circuit Court denying the request of Isaac L. Rice to institute proceedings against the Receivers of the Railroad and ex-President A. A. McLeod. In the course of his opinion Judge Dallas said: "We are satisfied that the facts which have been disclosed with respect to the dealings of A. A. McLeod with certain securities of the Philadelphia & Reading, justify the inquiry which the petitioner has occasioned, and, therefore, no costs will be imposed upon him. No opinion is indicated as to the liability of Mr. McLeod or any others who were concerned in those dealings, or in their assumption of them and his stock speculations in behalf of the company. Whether or not any proceedings based on the transactions referred to, should be instituted is a question the determination of which ought not to be unnecessarily assumed either by the court or the Receivers. It is very important that this receivership shall be terminated as soon as possible, and for this reason, irrespective of any other, we are indisposed to direct the Receivers to initiate a litigation which probably would be a protracted one, and which, so far as can now be known, might as well be commenced upon the conclusion of their administration as during its continuance. Therefore the subject is, for the present, relegated to the parties in interest, and the prayers of this petition are denied."

The annual report of the company for the year ending Nov. 30, makes the following showing:

	1894	1893.	Inc. or Dec.
Gross earn. (R. R. Co. alone) . . . . .	\$20,344,775	\$22,828,846	D \$2,484,071
Oper. expen. . . . .	11,278,989	13,369,423	D 2,090,434
Net earn. . . . .	\$9,065,785	\$9,459,422	D \$393,637
Other income . . . . .	505,632	609,072	D 103,440
Total net. . . . .	\$9,571,417	\$10,068,495	D \$497,078
Rentals and interest, etc. . . . .	10,478,823	10,675,188	D 196,365
Deficit . . . . .	\$907,405	\$606,693	I \$300,712
Coal and iron deficit . . . . .	1,025,601	195,649	I 829,952
Deficit . . . . .	\$1,933,006	\$802,342	I \$1,130,664
The Coal & Iron Company alone shows:			
Gross earn. . . . .	\$23,236,863	\$24,586,868	D \$2,350,004
Oper. expen. . . . .	21,968,310	23,482,672	D 1,514,361
Net earn. . . . .	\$268,552	\$1,104,195	D \$835,643
Fixed charges . . . . .	1,294,154	1,299,844	D 5,691
Deficit . . . . .	\$1,025,601	\$195,649	I \$829,952

The earnings of both companies are

Gross both companies . . . . .	\$43,714,142	\$48,742,763	D \$5,028,621
Net. both companies . . . . .	7,328,292	8,677,895	D 1,349,603

The losses for the year were: Loss coal traffic, \$1,543,553; loss merchandise traffic, \$729,678; loss passenger traffic, \$211,172; gain miscellaneous, \$1,532. The hard coal tonnage fell off 333,637 tons, and the soft 334,712 tons. Reading for itself carried 191,915 tons more than in 1893, but tonnage given by other roads fell off heavily. In the last six years \$5,366,975 has been spent in colliery improvements, and the tonnage could be materially increased.

The year's results show that the price of coal was 23.7c. per ton lower than in 1893, a loss of \$1,884,710. The company bought \$555,000 worth of boats and paid 18 per cent. cash. The balance is to be paid monthly for five years. The company still owes \$4,836,862 equipment notes, \$2,472,000 car trusts, a total of \$7,308,862. After this year at least \$500,000 worth of equipment will have to be bought annually.

Extraordinary charges as follows were put ahead of the bonds: Terminal trackage, \$467,945; equipment payments, \$1,241,027; Broad Street improvements, \$316,210; profit and loss, \$182,299; total, \$2,207,481. The deficit of both companies after allowing all interest charges was, \$1,933,002. Had these charges been made after the general mortgages, there would have been a surplus of \$274,474 after paying general mortgage interest.

**Roaring Creek & Charleston.**—On the application of Adrian Vandever, trustee of this company, the United States Court, for the district of West Virginia, has appointed Mr. Vandever Receiver for the company. Prior to this, William Phillips, of Tucker County, W. Va., had been appointed Receiver by the State Court. The application in the United States Court is intended to supersede the action of the State Court, but the Receiver of the State Court has refused to turn the property over to the new Receiver, and the matter will be tested in the United States Court when the application comes up on a final hearing of the motion to make the receivership permanent. The State Court claims to have full authority in the premises, and the people along the line of the road are anxious that the property shall continue under the State Court's control. There is about \$60,000 owing to local people for work and materials which the State Court Receiver proposes to pay in advance of the bondholders and outside creditors.

**Toledo, Ann Arbor & North Michigan.**—The United States Circuit Court at Toledo, has issued a decree of foreclosure sale of this road. The Court appointed Harry Blanchard, of Detroit, Master Commissioner, to sell the road. The foreclosure was against the consolidated mortgage bonds, on which more than \$150,000 interest is overdue. The decree was entered without prejudice. It affects only the consolidated bonds of the system. The six branch roads of the system have a mortgage bonded debt of \$5,500,000 in the aggregate, which are not immediately affected by this decree. The petitioners in this case were the Farmers' Loan & Trust Co., of New York; the Central Trust Co., of New York; and the Bondholders' Reorganization Committee. The Stockholders' Reorganization Committee were present through counsel to resist foreclosure.

**Union Pacific.**—A memorial to Congress has been prepared by the Board of Directors of the Union Pacific Railroad, offering to assess its stockholders a sum sufficient to pay all bonds which have priority over the lien of the United States in consideration of an extension of the debt of the United States for 50 years at 2 per cent. This would call for an assessment of about \$30 a share on stock now selling at less than \$12. The memorial recites that the debt to the Government is soon to mature, and on account of the danger of foreclosure the junior security holders are not likely to raise the \$20,000,000 necessary

to rehabilitate the company unless they are given a security in return. Some of the leading interests have agreed that if the Government would accept the low rate of interest suggested the property could be successfully reorganized. The plan is to give to the Government a first lien on the reorganized road, except such part of it as is not now covered by its mortgage. It is desired to reserve the right to issue other bonds on the branches. The approximate Government indebtedness on July 1 next will amount to about \$70,000,000, of which \$33,539,512 represents the principal. Other debt about maturing amounts to \$33,532,000, which represents mortgages that are prior to the Government lien.

**Worcester & Shrewsbury.**—The Massachusetts Railroad Commissioners last week heard the petition of the Worcester & Shrewsbury road for approval of an issue of \$30,000 bonds to carry out a proposed change in the location of the tracks of the line, near Worcester, Mass.

## TRAFFIC.

### Traffic Notes.

A freight bureau at Savannah, Ga., has been organized and begun business. The Commissioner is Captain Knapp.

The Railroad Commissioners of South Carolina, have ordered the railroads to make through joint freight rates at 20 per cent. less than the sum of the locals.

About 350,000 tons of coal was sent down the river from Pittsburg by boats last week. At first the water was so high that the river men did not dare to start out their fleets.

Nine branch post offices in Cleveland, O., are to receive and send their mails by electric street cars. The bags (closed) will be carried in the space at the front end of the car partitioned off for the motorman.

The street railroads of Savannah, Ga., have been carrying passengers for one cent each since early in the summer, the establishment of a new line having resulted in sharp competition. The bondholders of the Electric Railroad Company have now applied for the appointment of a receiver.

The Central Traffic Association has decided that it will be impossible to change the existing rule regarding the granting of clericalmen's half-fare permits. It is reported that the Pennsylvania lines west of Pittsburg have declined to issue any permits this year, and that the Pennsylvania has limited such orders to March 31.

Pennsylvania train No. 5, known as the fast mail, will hereafter run through to St. Louis, and there will be a fast train eastward, leaving St. Louis about 1 p. m. It is said that the speed of these trains will be about 45 miles an hour, including stops, shortening the time between St. Louis and New York about one hour.

According to the *Indianapolis Journal* the use of mileage tickets has doubled during the last two years in that region. The principal companies now issue tickets good on many other roads. A person holding a mileage ticket of the Cincinnati, Hamilton & Dayton, one of the Cleveland, Cincinnati, Chicago & St. Louis and one of the Pennsylvania lines can go to almost any point in the Central States.

The State Railroad Commissioners of Iowa have declined to allow the roads to increase their freight rates in that State. The request was denied in a majority report signed by two of the three members of the Board. The other member dissented and filed a minority report recommending a slight increase, stating that in his opinion the roads were entitled to it and could have made a better presentation of their side of the case than they did.

The Boston Freight Committee has succeeded in making a satisfactory adjustment of the differences existing about differentials on west bound rates. The differentials have been rearranged so as to harmonize with changed conditions in New England territory, and all the roads which belong to the Boston Freight Committee have agreed to maintain the standard rates west bound. This arrangement will result in the return of the New York New Haven & Hartford and the New York & New England roads to membership in the committee.

A lumber dealer of Pennsylvania states that a large amount of hemlock is being slaughtered in that State by the tannery operators merely for the bark. The trees are left on the ground to rot, because the railroads will not afford rates sufficiently low to transport them to the mills for sawing. Hemlock timber, joists and scantling are selling in central Pennsylvania towns for about \$9.50 a thousand. That is as much as white pine and Norway have averaged at Michigan and Wisconsin initial points this year. It seems as if no hemlock, in any part of Pennsylvania, should rot on the ground for lack of a profitable market. Hemlock is cut at northern Michigan and Wisconsin points and shipped 300 to 400 miles southward to retail yards. Why can not the like be done with Pennsylvania hemlock?—*Northwestern Lumberman.*

### Chicago Traffic Matters.

CHICAGO, Jan. 16, 1895.

Eastbound rates are now admitted to be again seriously demoralized, more especially on grain and provisions. Open reductions of five cents per 100 lbs. and over are being made on grain by some of the weak lines in their efforts to even up with the roads that are ahead of their agreed percentages. The situation will be brought to the attention of the Joint Committee this week and an effort made to remedy the trouble. Association officials are exceedingly reticent, but the indications are that some of the weak lines have been taking the matter of evening-up into their own hands. A weighty argument in favor of this supposition is that there is no apparent necessity for so large a reduction as has been made in the grain rates. If it were simply a question of evening up under the direction of the Commissioner according to the terms of the agreement under which the eastern lines are working, a reduction of one or two cents would seem to be all that would be required. The excuse given by some of the lines for the decided reduction is that all the grain is going via St. Louis on cut rates tendered there by eastern lines. Some confirmation of this position is found in the large purchases of export wheat at that point last week. The present demand for export wheat would not apparently justify any large purchase at maintained rates.

The present status of the proposed new trans-continental passenger association is as follows: The Canadian Pacific has agreed to become a member of the new association and to join the western immigrant clearing house, in return for which the western roads grant it differentials via Port Arthur on Pacific Coast business and promise to stop the excessive payments of commissions on immigrant business from Canadian ports. But the Grand Trunk objects to the granting of differentials to the Canadian Pacific from Canadian territory. Probably, however, the G. T. will have to make the best of the situation. The Southern Pacific and the Atchison have come to a definite understanding which has been submitted to the general meeting for ratification. It provides for the side-ride contended for by the Southern Pacific from Sacramento

to San Francisco and that of the Atchison from Los Angeles to San Diego, on all round trip tickets. The Atchison is to take 40 per cent of the round trip rate on tickets reading one way over its lines and the other roads are to have 60 per cent. The settlement is in the nature of a compromise, and it is hoped will dispose of this question for some time to come. The Union Pacific still declines to become a party to an advance in rates or a new agreement until the other lines remove the restrictions on its tickets via Ogden and Denver growing out of the demand of the Union Pacific that it receive the long haul from Omaha on all business tendered it from the east. There is some friction between the North Pacific coast lines in regard to rates and divisions, but it is thought a compromise will be reached in these matters.

Another attempt is being made this week to agree upon an advance in freight rates to Pacific coast points. The only thing now in the way of an advance is the demand of the Southern Pacific that rates from New York shall be the same as from Chicago to all Pacific coast points. The Atchison declines to participate unless rates are made less from Chicago than from New York.

The general managers of Central Traffic Association lines have voted a reduction in rates on articles of steel and iron from 5th to 6th class, effective April 1. This means an average reduction of about 20 per cent.

The Executive Committee of the Central Traffic Association has decided, subject to future action by the joint committee of eastern and western lines, to pay 7½ mills a mile on refrigerator cars interchanged between roads in the association, and to pay the rate per mile allowed by connections outside the association, not to exceed the above named rate.

The Chicago Freight Committee has adopted a rule making the minimum charge on shipments of iron over 20 feet in length 1,000 lbs. at first-class rates, and another rule that when shipments of perishable goods are delivered the consignee must indicate the points on the route where it is desired that the freight be reiced.

The appointment of Messrs. C. H. McKnight and H. C. Smith as Commissioner and Secretary, respectively, of the freight department of the Central Traffic Association is a deserved recognition of their services which for some time have been practically been in the lines indicated by the new titles.

The Central Traffic Association has declined the request of the southern roads for the use of the southern railway and steamship classification on traffic from points north of the Ohio River.

The eastbound statement below shows the effect of the cut in grain and provision rates, the last half of the week. The increase in shipments of grain and mill stuffs over the previous week was 4,326 tons; increase in cured meats 2,700 tons; increase in dressed beef 1,137 tons.

Total eastbound shipments of Flour, Grain and Provisions via Chicago and Chicago junctions (excluding tonnage of Indiana, Illinois and Iowa prior to May 1, 1894) for 1893 and 1894 were as follows:

Roads.	1894.				1893.			
	Flour and Grain	Provisions.	Total.	Per Cent.	Total.	Per Cent.		
B. & O. . . . .	85,313	55,147	140,460	7.7	117,164	6.0		
C. & C. & St. L. . . . .	68,526	25,623	95,149	5.2	104,590	5.4		
C. & E. . . . .	117,419	30,609	148,028	8.1	160,742	8.3		
C. & G. T. . . . .	193,618	60,364	253,978	13.8	253,819	13.1		
L. S. & M. S. . . . .	142,647	47,550	190,199	10.4	304,475	15.7		
M. C. . . . .	166,146	54,087	220,233	12.0	279,189	14.4		
N. Y. C. & St. L. . . . .	102,462	55,612	158,074	8.6	147,668	7.6		
P. C. C. & St. L. . . . .	111,729	98,360	210,089	11.5	138,573	7.1		
P. Ft. W. & C. . . . .	170,581	36,719	207,300	11.3	278,153	14.3		
Wabash. . . . .	168,909	40,168	209,077	11.4	156,994	8.1		
Total, 1894 . . . . .	1,327,346	505,299	1,832,645	100.0				
Total, 1893 . . . . .	1,519,451	421,916	1,941,367	100.0				

The shipments of eastbound freight, not including live stock from Chicago, by all the lines for the week ending Jan. 12 amounted to 41,846 tons, against 32,636 tons during the preceding week, an increase of 9,210 tons, and against 129,055 tons for the corresponding week last year. The proportion as carried by each road were:

ROADS.	WEEK TO Jan. 12.		WEEK TO Jan. 5.	
	Tons.	p. c.	Tons.	p. c.
Michigan Central. . . . .	3,444	8.3	2,706	8.2
Wabash. . . . .	3,906	9.3	3,358	10.3
Leke Shore & Mich. South. . . . .	5,099	12.2	4,782	14.7
Pitts., Ft. Wayne & Chicago. . . . .	3,859	9.3	2,796	8.5
Pitts., Cin. Chi. & St. Louis . . . . .	4,800	11.7	4,456	14.0
Baltimore & Ohio. . . . .	5,890	14.1	5,164	16.0
Chicago & Grand Trunk. . . . .	3,387	8.0	1,890	5.8
New York, Chic. & St. Louis . . . . .	3,551	8.4	2,432	7.5
Chicago & Erie. . . . .	4,670	11.1	2,955	9.0
C. C. C. & St. Louis. . . . .	3,150	7.5	1,917	6.0
Totals. . . . .	41,846	100.0	32,636	100.0

Of the above shipments 1,048 tons were flour, 14,125 tons grain and mill stuff, 10,147 tons cured meats, 9,425 tons dressed beef, 1,373 tons butter, 1,307 tons hides, and 3,501 tons lumber. The three Vanderbilt lines carried 28.9 per cent, the two Pennsylvania lines 21.0 per cent.

### Traffic on the Mississippi.

Gen. Booth, secretary of the Bridge Company at Dubuque, Ia., has made his report showing the number of craft passing the drawbridge at that city in 1894. The totals show 387 packets, 1,440 raft boats, 175 tow boats, 16 United States boats, 114 wood boats, 340 log rafts, 88 lumber rafts and 1,128 barges.

### Kansas City Live Stock Traffic.

The number of cars of live stock received at Kansas City in the year 1894 was 107,494, an increase over the previous year of 7,739. All of the roads show increases except the Atchison, which suffered a slight decrease. The figures for the Burlington show an increase of over 75 per cent. Of the total, about 65 per cent. were cattle and about 5 hogs. The shipments during 1894 amounted to 39,210 cars, a slight decrease from 1893. Of the shipments 83 per cent. were cattle and only 10 per cent. hogs.

### Southern Passenger Association.

This association has practically gone to pieces, only 10 representatives appearing in New York on Wednesday last, the day appointed for the annual meeting. The railroad officers present agreed, however, to call a mass meeting at Atlanta within three weeks to see about forming a new association. Most of the principal roads in the association gave notices of withdrawal some time ago, and these notices take effect at various dates between now and July 1.